

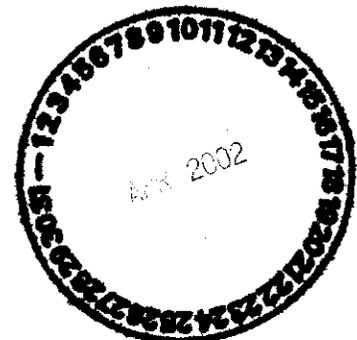


**CH-012  
Batch Data Report  
For  
233-S ISOCS NDA Assays**

Measurement and Analysis by: *[Signature]* Date: 4-4-02  
Martin Winterrose

Data Review by: *[Signature]* Date: 4/4/02  
Michael G. Cantaloub

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JUN 13 2002  
**EDMC**



## **1. Introduction**

This report documents results for two (2) standard waste boxes (SWB) and twelve (12) 55-gallon drums assayed by Canberra Hanford using the In Situ Object Counting System (ISOCS). All measurements were performed in accordance with the "Sampling and Analysis Plan for the 233-S Plutonium Concentration Facility" (DOE/RL-97-87 Rev. 1) and the Canberra Hanford Quality Control Plan and procedure. Additionally, the SWB measurements were conducted per the requirements of the "Work Plan for ISOCS NDA of Standard Waste Boxes (SWB)" CI-HAN-NDA-1011. All items were assayed at the 233-S facility. The SWBs were assayed on March 14, 2002. The drums were assayed during the time period from March 18 to April 3, 2002.

## **2. Technical Information**

### **SWBs**

The SWB assays were performed outdoors but within the confines of a temporary, open-air storage structure. The detector and pulse train were moved to the assay location after performance of the daily quality control measurements. As per CI-NDA-1011 the two largest (widest) sides were assayed. Each spectrum was analyzed individually with the results from the two assays averaged for the final SWB results. The detector was located 40 inches from the SWB and count times of 3600 seconds (live time) utilized.

The ISOCS efficiency calibration was created based upon the assumption that the SWBs were 100% full. The waste density was calculated based on the net weight of the SWB contents divided by the SWB volume. The ISOCS software is configured for rectangular boxes as opposed to the rounded sides of the SWB. As such, the efficiency calibration utilized dimensions of 64 by 52.25 by 34 inches (width, depth and height) yielding a total volume of 1863 L (See CI-NDA-1011 for more information). Waste matrix material type was varied to improve the correlation between the low and high energy Pu-239 lines and the low and high energy lines of Am-241.

### **55-gallon Drums**

The drums were assayed within the assay trailer at the 233-S facility grounds. Assays were conducted for 1800 seconds live. The drums were continuously rotating at a speed of approximately 6 rpm during data acquisition. Rotating the drum helps average out and minimizes the potential of sample self-shielding. All but one of the assays were performed at a detector-to-drum distance of 24 inches with the detector 'aimed' roughly midway up the drum. One drum was assayed at 28 inches due to a higher than typical dead time. The detector sides were shielded with a lead collimator to minimize scatter and background.

Individual ISOCS efficiency calibrations were created for each drum based upon the assumption that the drum was full and had an average density based on the net weight of the drum (waste matrix) divided by the drum volume (208 liters). A tare weight of ~26

kg was assumed. Model matrices were varied somewhat with respect to density and material 'Z' to obtain reasonable correlation between the low and high energy Pu-239 and Am-241 emissions.

Final package results for the SWBs and drums were calculated using the Analysis V3.0b spreadsheet. Data analysis was conservative. Method selections (e.g. measured Am-241 versus Am-241 calculated from the measured Pu-239) normally favored higher final results. Additionally, in all measurements performed as a part of this batch, the actual total measurement uncertainty should be significantly lower than the reported value. This is expected as the uncertainty calculation for the Am-241 is based on the 59.5 keV gamma and all the assays have good results for the higher energy Am-241 gamma emissions.

Results for item 233S-01-0115 were reported previously in CH010. The initial results classified the drum as low-level waste. After repackaging, including the addition of other waste items, the drum was measured and reported in this batch data report. Final characterization is TRU. Finally, several items had Np-237 concentrations exceeding the warning limit. Though Np-237 can be problematic, for these drums it is not deemed significant enough to alter the final drum characterization results.

### 3. Quality Control Results

Daily background and quality control (QC) check source measurements were performed on the system prior to each day's measurements. Charts for these measurements are on pages 5 - 11. The control charts cover the period from February 2, 2002 to April 4, 2002. During the time period, the system was operating properly. The peak area and centroid control charts indicate a very stable system.

Drum 233S-01-0129 was randomly selected for replicate measurement and was assayed on March 27, 2002. As shown in the table below, the replicate satisfies the quality requirements of the difference in measurement values are within 2 sigma of the reported measurement uncertainties. A replicate assay was not conducted with one of the two SWBs.

Replicate Analysis	Drum 233S-01-0129
$ Pu-239(orig) - Pu-239(rep) $	14
$1.96 * \sqrt{[unc(orig)]^2 + [unc(rep)]^2}$	78

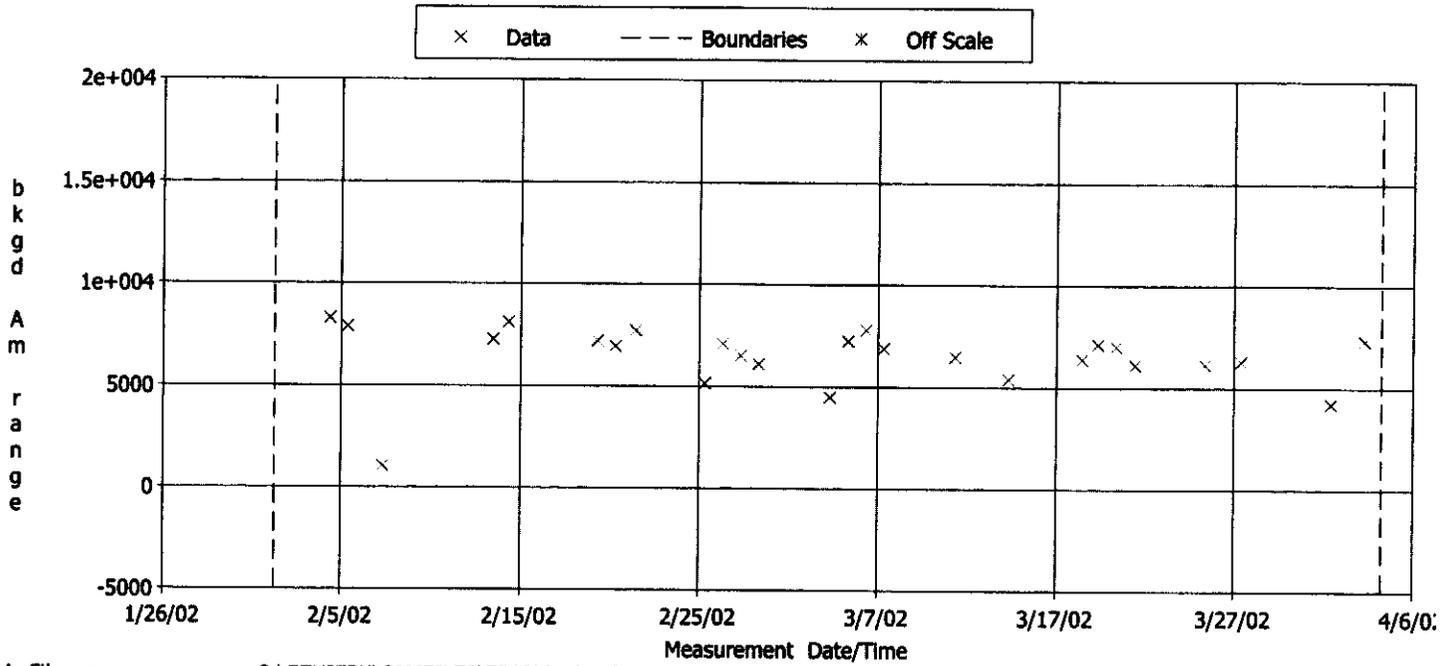
#### 4. Summary of Results

Full data packages for each item are included as an attachment beginning on page 12. The following table (page 4) summarizes the total TRU activity results and plutonium gram values for each item. The 'Pu Mass + 3-sigma' values in the table are based solely on counting statistics. The 'Pu Mass + 3-sigma TMU' values are not included here, but are reported on the final result spreadsheets.

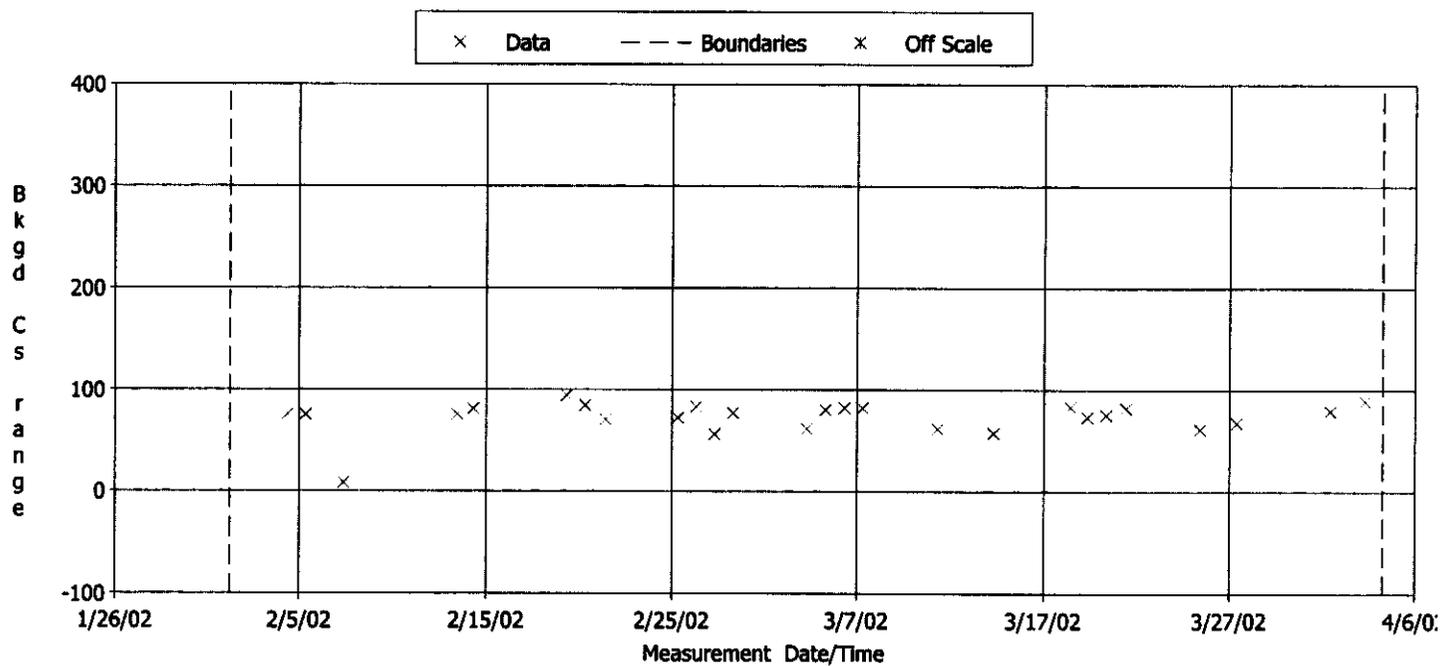
Summary of package assay results for Data Batch Report CH012						
Package Item ID	Assay Weight (kg)	TRU Act (nCi/g)	TRU TMU (nCi/g)	Pu Mass (g)	Pu Mass(g) + 3 sigma	Description, calculation notes
0053	907	7.62E+03 ±	1.89E+04	5.09E+01	6.04E+01	SWB with packages
0054	962	5.74E+03 ±	1.38E+04	4.12E+01	4.80E+01	SWB with packages
0022	135	2.16E+02 ±	1.94E+02	1.64E-01	2.17E-01	55-gallon drum
0087	136	6.74E+02 ±	7.02E+02	8.01E-01	9.98E-01	55-gallon drum
0112	155	2.61E+02 ±	2.35E+02	2.27E-01	2.94E-01	55-gallon drum
0115	111	1.41E+03 ±	6.75E+02	8.85E-01	1.10E+00	55-gallon drum
0116	154	2.19E+03	1.97E+03	1.90E+00	2.36E+00	55-gallon drum
0125	140	1.60E+02 ±	1.44E+02	1.26E-01	1.67E-01	55-gallon drum
0127	109	1.78E+03	8.52E+02	1.09E+00	1.36E+00	55-gallon drum
0128	40	1.93E+03 ±	4.23E+02	6.24E-01	7.78E-01	55-gallon drum
0129	142	1.15E+03 ±	1.03E+03	9.19E-01	1.15E+00	55-gallon drum
0129 REP	142	1.10E+03 ±	9.91E+02	8.81E-01	1.10E+00	55-gallon drum
0131	39	8.45E+04 ±	2.45E+04	1.88E+01	2.34E+01	55-gallon drum
0132	151	5.12E+03	4.59E+03	4.33E+00	5.36E+00	55-gallon drum
0133	140	3.31E+03	2.97E+03	2.60E+00	3.22E+00	55-gallon drum

14 TRU packages  
0 LLW packages

## **Control Charts**

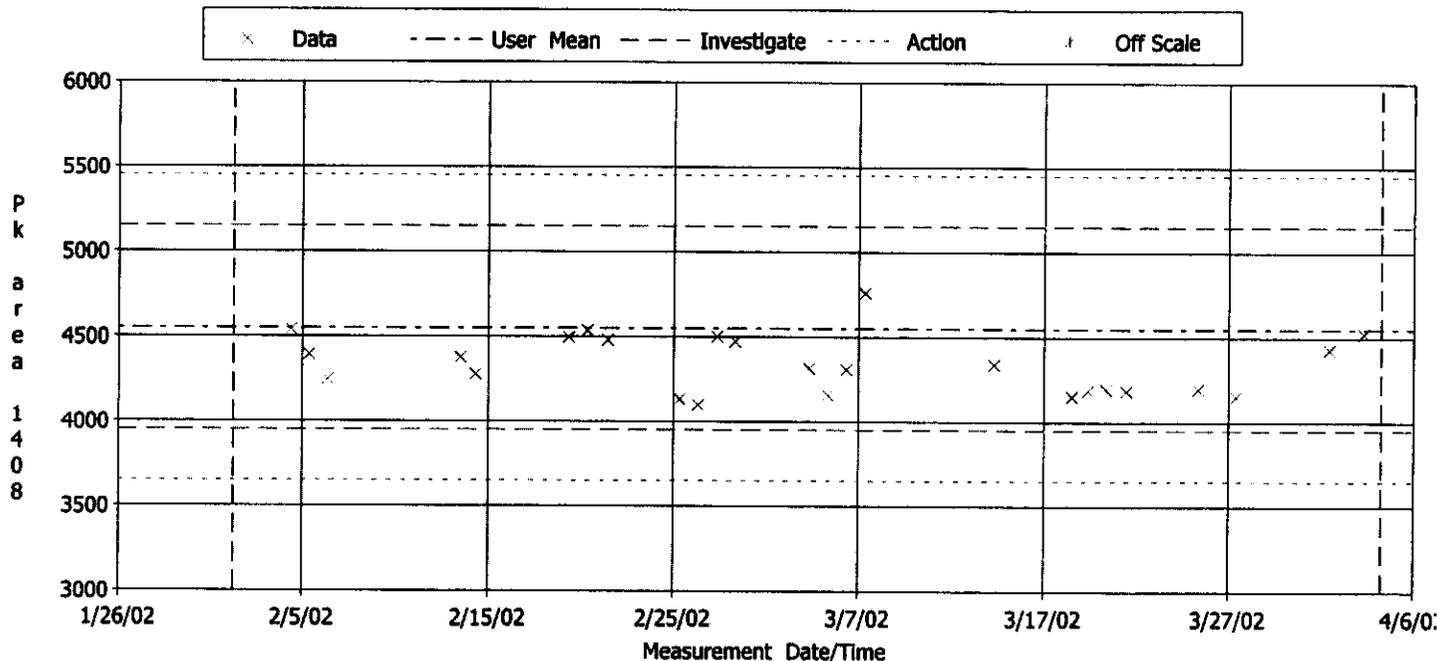


QA Filename : C:\GENIE2K\CAMFILES\7219bkgd.qaf  
 Parameter Description : bkgd Am range (counts)  
 Selection Dates : 2/01/02 6:00:00 AM - 4/04/02 6:00:00 AM  
 Lower/Upper Boundaries : 0.000 - 15000.000

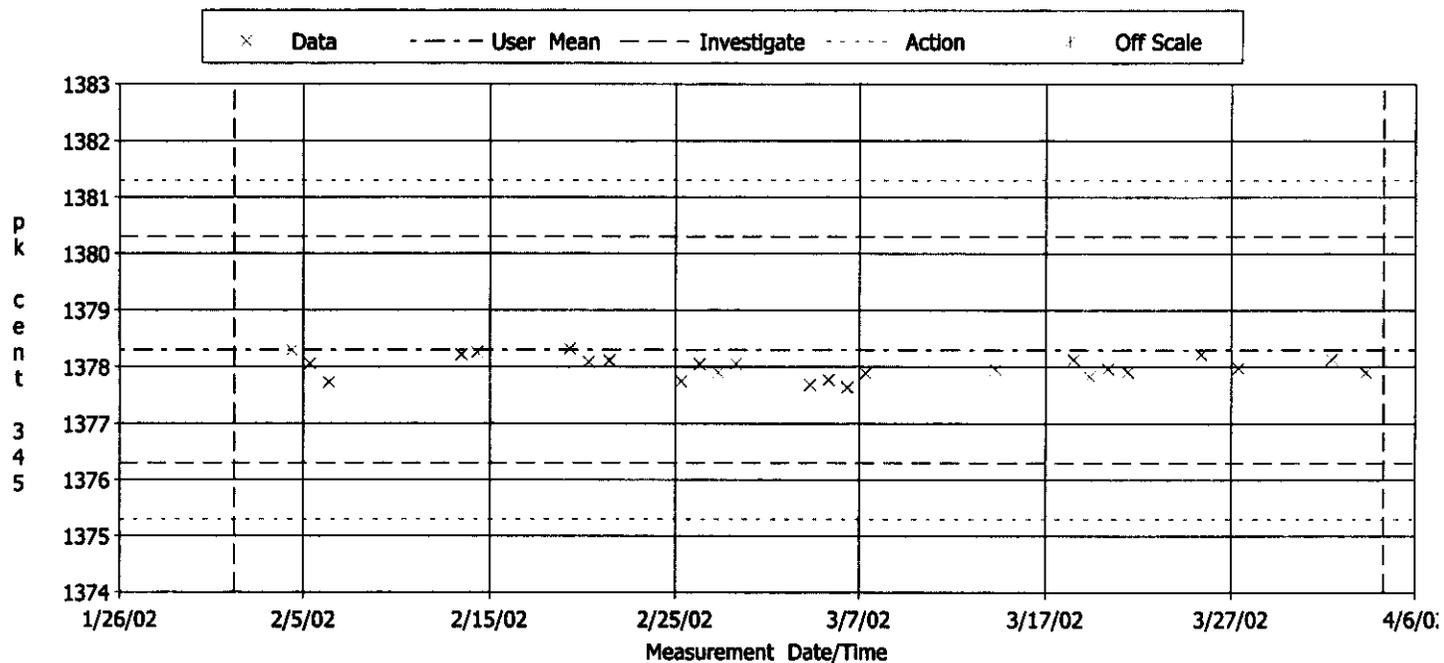


QA Filename : C:\GENIE2K\CAMFILES\7219bkgd.qaf  
 Parameter Description : Bkgd Cs range (counts)  
 Selection Dates : 2/01/02 6:00:00 AM - 4/04/02 6:00:00 AM  
 Lower/Upper Boundaries : 0.000 - 300.000

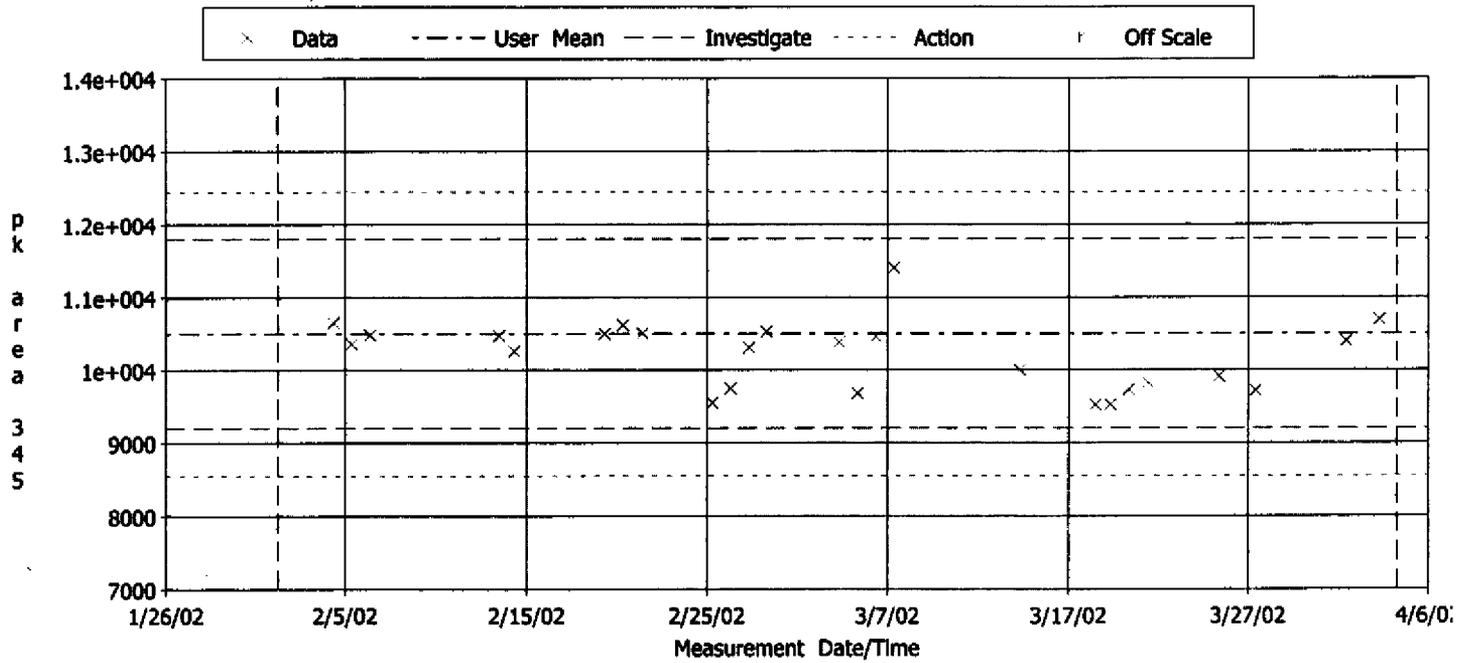




QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf  
 Parameter Description : Pk area 1408 (counts)  
 Selection Dates : 2/01/02 6:00:00 AM - 4/04/02 6:00:00 AM  
 User Mean +/- Std Dev : 4550.000 +/- 3.00e+002



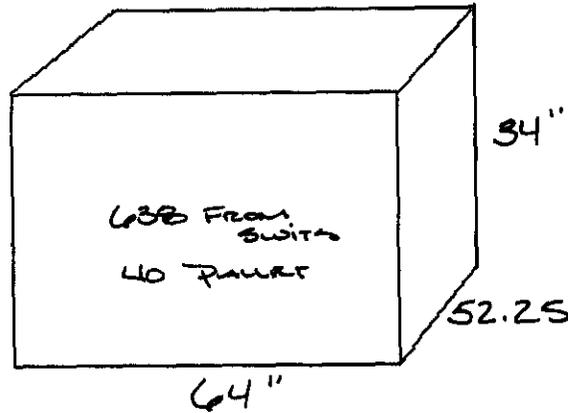
QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf  
 Parameter Description : pk cent 345 (ch)  
 Selection Dates : 2/01/02 6:00:00 AM - 4/04/02 6:00:00 AM  
 User Mean +/- Std Dev : 1378.300 +/- 1.000



QA Filename : C:\GENIE2K\CAMFILES\qa 7219.qaf  
 Parameter Description : pk area 345 (counts)  
 Selection Dates : 2/01/02 6:00:00 AM - 4/04/02 6:00:00 AM  
 User Mean +/- Std Dev : 10500.000 +/- 6.50e+002

## **Data Packages**

**Bldg 233-S**  
**NDA Item Description Sheet**  
**Box Geometry**



Put Dimensions on Box

2680  
- 678  
NET 2002 LBS  
NET 910 KG

Item ID: 233S-01-0053

Weight (kg): 2680 LBS 1218.18 kg

Material Description: Packaging IN SIVA

Packaging: SUB

Detector Distance (in): 60"

Detector Filters: NONE

Dose Rate: LS

Comments: SIDE A 3600 1364  
SIDE B 3600 1367  
.4084

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0053 SWB  
 File Name: 1366

Assay Date: 14-Mar-02  
 File Name: 1367

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	4.55E+03	3.56E+02
Am-241	2.56E+03	1.20E+02
Np-237	5.06E-01	2.43E-02
U-238		
U-235		
Cs-137	1.20E-01	3.84E-03
Co-60		

Activity (uCi/kg)	Meas Uncert
1.46E+03	1.16E+02
1.10E+03	7.59E+01
2.81E-01	1.38E-02
1.43E+00	4.51E-02

Item Parameters:

Contamination: Internal

Item Type: Box

Calcs: Average

Dimensions:

Length (in): 34  
 Weight (lbs): 2002

Width (in): 64  
 Depth for TMU (in): 8

Depth (in): 52.25  
 % Volume: 30

Am-241 Calcs:

Measured	1.83E+03	+/-	1.83E+04	Use Meas
Calculated	4.16E+03	+/-	1.38E+04	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.22E+03	+/-	1.63E+03
Pu-239	3.00E+03	+/-	4.02E+03
Pu-240	1.57E+03	+/-	2.10E+03
Pu-241	5.85E+03	+/-	7.83E+03
Pu-242	1.58E+00	+/-	2.12E+00
Am-241	1.83E+03	+/-	1.83E+04
Np-237	3.94E-01	+/-	5.26E-01
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	7.75E-01	+/-	1.04E+00
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	7.62E+03	+/-	1.89E+04	Calc from Pu-239 Act
Pu (g):	5.09E+01	Pu (g) + 3 sigma TMU:	2.55E+02	
		Pu(g) + 3 sigma:	6.04E+01	

Comments:

	Errors:
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Analyst:

Martin Winterrose

Date: 3/22/02

#Date & Time: Mon Mar 18 10:34:18 2002

~g=SIMPLE\_BOX

~description=233S-01-0053SWB

~comment=SWB\_BOX

~Ccollimator=50MM-180D

~crpn=4

~Detector=7219

~Convergence in %=1 ~MDRPN=4

~Lunit=IN ~Tunit=C ~Dunit=G/CU.C ~Punit=MM.HG

~at=20 ~ap=760 ~rh=50

~Energies kev=	50.000,	100.000,	128.000,	130.000,	150.000,	200.000,#
	300.000,	500.000,	700.000,	1000.000,	1400.000,	2000.000,#
	4000.000,					

~Error in %=	10.000,	10.000,	10.000,	10.000,	10.000,	8.000,#
	8.000,	6.000,	6.000,	4.000,	4.000,	4.000,#
	4.000,					

~d1.1=0.1345 ~d1.2=64 ~d1.3=34 ~d1.4=52.25 ~lmater=CSTEEL ~lden=7.86

~d3.1=33 ~3mater=SAMPLEHS ~3den=0.48695 ~3con=1

~sdl=60

CANBERRA ISOCS ANALYSIS

Report Generated On : 3/22/02 10:20:50 AM

Sample Title : 233s-01-0053 Side A  
 Spectrum Description :  
 Sample Identification : 1366  
 Sample Size : 907.3 kg

Sample Taken On : 3/14/02 10:24:00 AM  
 Acquisition Started : 3/14/02 10:24:58 AM

Live Time: 3600.0 seconds Real Time: 3733.9 seconds

ISOCS Calabration : 233S-01-0053S  
 Energy Calibration Used Done On : 2/27/01  
 Efficiency Calibration Used Done On : 3/18/02

PEAK ANALYSIS REPORT

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	237.82	59.54	2.69E+006	2159.29	4.33E+005
M 2	280.58	70.23	1.16E+003	161.75	5.92E+004
m 3	292.14	73.12	1.90E+004	650.21	6.37E+004
m 4	300.87	75.30	3.50E+004	1014.30	6.92E+004
5	340.00	85.08	5.78E+003	607.21	9.97E+004
M 6	371.13	92.86	2.88E+003	307.52	1.15E+005
m 7	379.94	95.06	3.27E+004	922.04	1.11E+005
m 8	388.41	97.18	1.06E+004	841.20	1.12E+005
m 9	396.02	99.08	1.04E+005	2688.70	1.03E+005
m 10	404.75	101.26	1.38E+004	577.41	1.02E+005
m 11	413.32	103.40	5.42E+004	1529.87	9.72E+004
m 12	418.29	104.64	1.00E+004	538.94	8.74E+004
M 13	445.45	111.43	2.70E+004	256.07	1.01E+005
m 14	460.99	115.32	2.19E+004	243.25	1.24E+005
M 15	502.57	125.71	1.20E+004	211.70	4.94E+004
m 16	518.61	129.72	5.89E+004	295.90	5.82E+004
M 17	578.42	144.66	5.12E+003	453.59	7.47E+004
m 18	595.90	149.03	1.06E+004	632.50	1.25E+005
19	646.00	161.55	3.17E+003	380.55	4.52E+004
M 20	679.40	169.90	9.19E+002	518.02	3.95E+004
m 21	686.48	171.67	1.80E+003	739.73	5.62E+004
22	718.00	179.55	1.16E+003	330.47	3.59E+004
M 23	758.33	189.63	7.83E+002	132.72	2.65E+004
m 24	783.79	195.99	1.82E+003	142.59	3.08E+004
M 25	815.37	203.88	1.01E+004	257.56	3.61E+004
m 26	833.22	208.34	3.34E+004	689.95	3.56E+004
27	1022.00	255.52	1.21E+003	257.52	2.07E+004
28	1072.00	268.02	7.40E+002	198.77	1.47E+004
29	1200.67	300.17	1.51E+004	342.94	2.46E+004
30	1247.99	312.00	9.60E+004	487.27	2.66E+004
31	1286.00	321.50	3.33E+003	270.63	1.64E+004
M 32	1331.94	332.98	1.37E+004	371.53	1.20E+004
m 33	1363.11	340.77	1.20E+004	334.10	1.08E+004

m	34	1380.94	345.23	1.15E+004	324.93	9.69E+003
M	35	1474.25	368.55	4.43E+003	112.29	9.42E+003
m	36	1501.19	375.28	3.60E+004	486.30	8.54E+003
m	37	1521.81	380.43	6.92E+003	137.23	7.68E+003
M	38	1572.52	393.11	1.20E+004	343.65	7.60E+003
m	39	1594.81	398.68	4.01E+003	137.63	6.97E+003
M	40	1655.98	413.97	3.36E+004	179.11	6.80E+003
m	41	1691.23	422.78	2.62E+003	69.95	5.95E+003
m	42	1707.81	426.92	6.84E+002	55.93	5.81E+003

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	1806.17	451.50	4.07E+003	156.56	5.27E+003
44	2044.00	510.94	5.98E+002	130.69	3.87E+003
45	2333.00	583.17	4.27E+002	91.89	2.13E+003
46	2437.00	609.16	3.74E+002	65.63	1.31E+003
47	2475.00	618.65	4.73E+002	81.24	1.69E+003
M 48	2561.98	640.39	2.14E+002	61.91	1.73E+003
m 49	2583.99	645.89	2.93E+002	74.70	2.44E+003
m 50	2611.49	652.77	3.66E+002	91.17	2.42E+003
51	2647.04	661.65	4.60E+004	237.29	1.73E+003
52	2755.00	688.63	2.04E+002	34.53	3.04E+002
53	2891.32	722.70	1.48E+003	52.62	3.03E+002
54	3025.00	756.11	1.71E+002	31.40	2.10E+002
55	3079.00	769.60	2.18E+002	38.15	3.10E+002
56	3646.00	911.31	2.22E+002	33.74	2.03E+002
57	3877.00	969.04	1.34E+002	37.19	2.43E+002
58	4484.00	1120.74	1.30E+002	24.98	1.28E+002
59	5101.00	1274.94	1.26E+002	25.75	1.26E+002
60	5848.00	1461.63	1.80E+003	49.52	1.09E+002
61	7065.00	1765.78	1.31E+002	14.85	2.17E+001

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	1.20378E-001	3.83904E-003
NP-237	1.000	300.17*	6.20	4.56268E-001	2.43453E-002
		312.00*	36.00	5.06087E-001	2.43328E-002
		340.60*	4.20	5.54504E-001	2.99663E-002
Pu-239	0.997	129.28*	0.01	2.70451E+003	4.54295E+002
		375.00*	0.00	4.53304E+003	3.54903E+002
		413.70*	0.00	4.54958E+003	3.56007E+002
		451.50* @	0.00	4.48486E+003	2.46386E+002
AM-241	1.000	59.54*	35.70	2.12560E+003	1.69082E+002
		125.28*	0.00	9.13476E+002	4.70785E+001
		335.40*	0.00	5.34203E+003	2.88785E+002
		662.42* @	0.00	2.84627E+004	9.04456E+002
		722.70*	0.00	2.55846E+003	1.20284E+002
PU-241	0.973	114.00*	0.02	3.57979E+002	1.97927E+001
		332.60*	0.00	9.14352E+002	4.94289E+001

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg )	Wt mean Activity Uncertainty
CS-137	1.000	1.151669E-001	3.829370E-003
NP-237	1.000	4.993747E-001	1.492410E-002
Pu-239	@ 0.997	4.110817E+003	2.199280E+002
AM-241	@ 1.000	1.232150E+003	4.204743E+001
PU-241	0.973	4.057187E+002	1.840128E+001

? = nuclide is part of an undetermined solution  
 X = nuclide rejected by the interference analysis  
 @ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

NUCLIDE TOTALS

Nuclide	Mass (g)
Pu-239	6.02E+001 +/- 3.22E+000



CANBERRA ISOCS ANALYSIS

Report Generated On : 3/18/02 10:44:40 AM  
 Sample Title : 233s-01-0053 Side B  
 Spectrum Description :  
 Sample Identification : 1367  
 Sample Size : 907.3 kg  
 Sample Taken On : 3/14/02 11:43:00 AM  
 Acquisition Started : 3/14/02 11:43:51 AM

Live Time: 3600.0 seconds Real Time: 3707.2 seconds

ISOCS Calibration : 233S-01-0053S  
 Energy Calibration Used Done On : 2/27/01  
 Efficiency Calibration Used Done On : 3/18/02

PEAK ANALYSIS REPORT

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	237.82	59.54	1.19E+006	1459.06	2.07E+005
M 2	292.19	73.13	1.87E+004	617.94	6.16E+004
m 3	300.92	75.31	3.49E+004	963.26	6.08E+004
4	340.00	85.08	5.55E+003	561.33	8.50E+004
M 5	369.44	92.44	2.45E+003	228.25	7.10E+004
m 6	379.89	95.05	1.89E+004	682.95	9.65E+004
m 7	387.04	96.83	3.83E+003	405.07	9.58E+004
m 8	395.93	99.05	5.48E+004	1785.80	9.48E+004
m 9	404.38	101.17	4.96E+003	308.64	9.73E+004
m 10	413.25	103.38	2.73E+004	993.09	9.62E+004
m 11	418.23	104.63	4.35E+003	421.01	9.57E+004
M 12	445.49	111.44	1.46E+004	1004.47	9.42E+004
m 13	460.65	115.23	9.94E+003	658.71	1.13E+005
M 14	502.54	125.70	5.99E+003	192.27	5.12E+004
m 15	518.60	129.71	2.30E+004	235.88	6.21E+004
M 16	577.91	144.53	1.95E+003	501.37	6.41E+004
m 17	586.23	146.61	9.21E+002	243.09	9.29E+004
m 18	595.86	149.02	3.23E+003	610.12	1.21E+005
19	646.00	161.55	1.39E+003	404.98	5.19E+004
M 20	758.21	189.59	5.28E+002	160.84	4.42E+004
m 21	783.07	195.81	6.84E+002	164.41	4.83E+004
M 22	815.72	203.97	3.19E+003	181.73	4.27E+004
m 23	833.29	208.36	9.97E+003	406.40	4.61E+004
24	1200.67	300.17	9.28E+003	474.88	4.67E+004
25	1247.99	312.00	5.34E+004	549.66	4.85E+004
M 26	1331.89	332.97	4.24E+003	131.42	2.87E+004
m 27	1362.96	340.73	6.50E+003	137.63	2.91E+004
m 28	1380.98	345.24	3.81E+003	127.48	2.85E+004
M 29	1501.30	375.31	1.10E+004	568.60	2.78E+004
m 30	1531.95	382.97	1.74E+003	144.62	2.58E+004
M 31	1572.42	393.08	4.82E+003	81402.1	2.25E+004
m 32	1594.78	398.67	3.62E+003	51349.5	4.97E+004
M 33	1655.99	413.97	1.08E+004	149.66	2.26E+004

m	34	1691.11	422.74	8.99E+002	113.21	3.08E+004
	35	1806.17	451.50	1.33E+003	445.40	3.93E+004
	36	2438.00	609.41	2.38E+002	111.91	4.26E+003
	37	2647.04	661.65	5.48E+005	769.26	6.93E+003
	38	2891.32	722.70	6.33E+002	39.31	2.53E+002
	39	3077.00	769.10	1.71E+002	38.71	2.87E+002
	40	3184.00	795.84	8.12E+001	24.77	1.47E+002
	41	3646.00	911.31	2.93E+002	28.97	1.41E+002
	42	3876.00	968.79	1.37E+002	24.85	1.42E+002

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	4483.00	1120.49	1.41E+002	26.85	1.40E+002
44	5633.23	1407.95	2.98E+001	12.48	4.02E+001
45	5848.00	1461.63	1.90E+003	47.35	6.45E+001
46	7064.00	1765.53	1.38E+002	15.29	2.10E+001

N U C L I D E   I D E N T I F I C A T I O N   R E P O R T

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	1.43168E+000	4.51032E-002
NP-237	1.000	300.17*	6.20	2.81132E-001	1.97773E-002
		312.00*	36.00	2.81350E-001	1.37602E-002
		340.60*	4.20	3.00514E-001	1.53040E-002
Pu-239	0.997	129.28*	0.01	1.05804E+003	1.77976E+002
		375.00*	0.00	1.38081E+003	1.28360E+002
		413.70*	0.00	1.46373E+003	1.16051E+002
		451.50* @	0.00	1.46703E+003	4.94570E+002
AM-241	1.000	59.54*	35.70	9.37412E+002	7.45719E+001
		125.28*	0.00	4.55513E+002	2.64719E+001
		335.40*	0.00	1.65448E+003	9.28045E+001
		662.42* @	0.00	3.38513E+005	1.06251E+004
		722.70*	0.00	1.09502E+003	7.58613E+001
PU-241	0.976	114.00*	0.02	1.63058E+002	1.39581E+001
		332.60*	0.00	2.83185E+002	1.58846E+001

I N T E R F E R E N C E   C O R R E C T E D   R E P O R T

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg )	Wt mean Activity Uncertainty
CS-137	1.000	1.431679E+000	4.493694E-002
NP-237	1.000	2.880619E-001	9.088042E-003
Pu-239	@ 0.997	1.356588E+003	7.749488E+001
AM-241	@ 1.000	5.713879E+002	2.327393E+001
PU-241	0.976	1.727858E+002	1.062788E+001

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

N U C L I D E   T O T A L S

Nuclide	Mass (g)
Pu-239	1.99E+001 +/- 1.13E+000

\*\*\*\*\*  
 \*\*\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg )	Nuclide MDA (uCi/kg )	Activity (uCi/kg )
	CO-60	1173.22	100.00	2.0518E-004	1.53E-004	-1.2184E-004
		1332.49	100.00	1.5333E-004		-4.4299E-004
	CS-134	475.35	1.46	1.4914E-001	2.74E-004	4.0666E-001
		563.23	8.38	1.5213E-002		-1.0465E-002
		569.32	15.43	8.0887E-003		3.0218E-003
		604.70	97.60	1.2259E-003		7.4369E-005
		795.84	85.40	2.7393E-004		1.0418E-004
		801.93	8.73	2.6028E-003		1.4228E-004
		1038.57	1.00	2.0676E-002		-9.6945E-003
		1167.94	1.80	1.1496E-002		-8.8428E-003
		1365.15	3.04	4.9077E-003		1.1494E-003
+	CS-137	661.65*	85.12	1.8157E-003	1.82E-003	1.4317E+000
+	NP-237	300.17*	6.20	4.6448E-002	8.66E-003	2.8113E-001
		312.00*	36.00	8.6623E-003		2.8135E-001
		340.60*	4.20	3.6784E-002		3.0051E-001
+	Pu-239	129.28*	0.01	5.3393E+001	5.34E+001	1.0580E+003
		375.00*	0.00	9.8204E+001		1.3808E+003
		413.70*	0.00	9.4882E+001		1.4637E+003
		451.50*	0.00	1.6137E+003		1.4670E+003
+	AM-241	59.54*	35.70	2.5243E+000	2.52E+000	9.3741E+002
		125.28*	0.00	8.0299E+001		4.5551E+002
		335.40*	0.00	3.0841E+002		1.6545E+003
		662.42*	0.00	4.2931E+002		3.3851E+005
		722.70*	0.00	1.7651E+002		1.0950E+003
+	PU-241	114.00*	0.02	2.5648E+001	2.56E+001	1.6306E+002
		332.60*	0.00	5.2789E+001		2.8318E+002
	CM-243	209.70	3.27	8.5752E-002	1.63E-002	2.0364E-002
		228.18	10.56	2.3388E-002		2.2387E-003
		277.60	14.00	1.6296E-002		-2.9060E-002

+ = Nuclide identified during the nuclide identification  
 \* = Energy line found in the spectrum  
 > = MDA value not calculated  
 @ = Half-life too short to be able to perform the decay correction

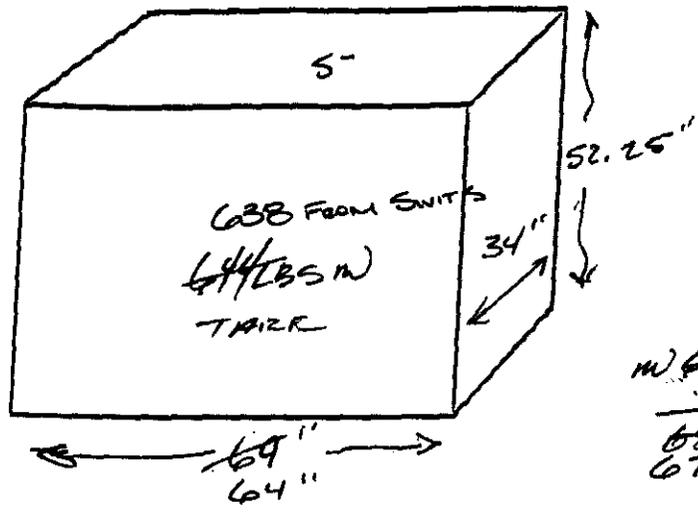
TEST

# Bldg 233s NDA Item Description Sheet Box Geometry

14TT

PAKET 40 LBS

638



638  
 W) 644 SWB  
 .40 PAKET  
 -----  
 684 LBS  
 678

Put Dimensions on Box

Item ID: 2335-01-0054

Weight (kg): 2800 LBS

Material Description: PACKAGES IN SWB

Packaging: SWB

Detector Distance (in): 40"

Detector Filters: None

Dose Rate: 1.5

Comments: A 3600 1368

B 3600 1369

RESULTS USED WAS .7500 -

(GROSS 2800  
 TARE 684 W)  
 -----  
 NET 2116 LBS  
 964.54  
 OR 961.81 kg

0.516234  
 .517698  
 .5177

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0054  
 File Name: 1368

Assay Date: 14-Mar-02  
 File Name: 1369

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	2.23E+03	1.75E+02
Am-241	1.49E+03	7.72E+01
Np-237	3.44E-01	1.65E-02
U-238	2.25E-02	6.71E-03
U-235		
Cs-137	2.49E-02	8.27E-04
Co-60		

Activity (uCi/kg)	Meas Uncert
2.35E+03	1.86E+02
1.17E+03	7.17E+01
2.26E-01	1.09E-02
1.10E-02	3.97E-04

Item Parameters:

Contamination: Internal

Item Type: Box

Calcs: Average

Dimensions:

Length (in): 34

Width (in): 64

Depth (in): 52.25

Weight (lbs): 2122

Depth for TMU (in): 8

% Volume: 30

Am-241 Calcs:

Measured	1.33E+03	+/-	1.33E+04	Use Meas
Calculated	3.17E+03	+/-	1.05E+04	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	9.29E+02	+/-	1.24E+03
Pu-239	2.29E+03	+/-	3.07E+03
Pu-240	1.19E+03	+/-	1.60E+03
Pu-241	4.46E+03	+/-	5.97E+03
Pu-242	1.21E+00	+/-	1.61E+00
Am-241	1.33E+03	+/-	1.33E+04
Np-237	2.85E-01	+/-	3.81E-01
U-238	1.12E-02	+/-	1.54E-02
U-235	0.00E+00	+/-	0.00E+00
Cs-137	1.80E-02	+/-	2.40E-02
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	5.74E+03	+/-	1.38E+04	Calc from Pu-239 Act
Pu (g):	4.12E+01	Pu (g) + 3 sigma TMU:	2.06E+02	
		Pu(g) + 3 sigma:	4.80E+01	

Comments:

Am-241 from 722 keV peak. Errors:

Analyst:

Martin Winterrose

Date: 4/4/02

#Date & Time: Mon Mar 18 11:33:01 2002

~g=SIMPLE\_BOX

~description=233S-01-0054SWB

~comment=SWB\_BOX

~Ccollimator=50MM-180D

~crpn=4

~Detector=7219

~Convergence in %=1 ~MDRPN=4

~Lunit=IN ~Tunit=C ~Dunit=G/CU.C ~Punit=MM.HG

~at=20 ~ap=760 ~rh=50

~Energies kev= 50.000, 100.000, 128.000, 130.000, 150.000, 200.000,#  
300.000, 500.000, 700.000, 1000.000, 1400.000, 2000.000,#  
4000.000,

~Error in %= 10.000, 10.000, 10.000, 10.000, 10.000, 10.000, 8.000,#  
8.000, 6.000, 6.000, 4.000, 4.000, 4.000,#  
4.000,

~d1.1=0.1345 ~d1.2=64 ~d1.3=34 ~d1.4=52.25 ~lmater=CSTEEL ~lden=7.86

~d3.1=33 ~3mater=SWB ~3den=0.75 ~3con=1

~sdl=40

C A N B E R R A I S O C S A N A L Y S I S

Report Generated On : 3/18/02 11:48:21 AM  
 Sample Title : 233s-01-0054 Side A  
 Spectrum Description :  
 Sample Identification : 1368  
 Sample Size : 961.8 kg  
 Sample Taken On : 3/14/02 1:02:00 PM  
 Acquisition Started : 3/14/02 1:06:54 PM

Live Time: 3600.0 seconds Real Time: 3708.6 seconds

ISOCS Calabration : 233S-01-0054S  
 Energy Calibration Used Done On : 2/27/01  
 Efficiency Calibration Used Done On : 3/18/02

P E A K A N A L Y S I S R E P O R T

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	237.82	59.54	2.02E+006	1928.43	3.80E+005
M 2	292.28	73.15	1.76E+004	641.62	4.96E+004
m 3	300.91	75.31	3.22E+004	975.53	6.66E+004
M 4	340.39	85.18	2.00E+004	507.08	9.27E+004
m 5	348.86	87.29	1.69E+004	429.33	1.19E+005
m 6	356.63	89.23	1.03E+004	337.40	1.23E+005
m 7	363.75	91.01	1.19E+004	384.50	1.19E+005
m 8	370.67	92.74	1.53E+004	468.59	1.22E+005
m 9	379.66	94.99	5.05E+004	1113.10	1.21E+005
m 10	386.81	96.78	1.83E+004	691.90	1.21E+005
m 11	395.89	99.05	1.26E+005	2588.16	1.20E+005
m 12	404.25	101.13	2.22E+004	582.16	1.15E+005
m 13	413.37	103.41	6.35E+004	1436.37	1.14E+005
m 14	418.31	104.65	1.23E+004	651.23	1.07E+005
M 15	445.54	111.45	2.67E+004	1000.85	8.99E+004
m 16	458.98	114.81	1.63E+004	732.73	1.14E+005
m 17	464.50	116.19	7.13E+003	434.98	1.13E+005
m 18	470.56	117.71	3.03E+003	323.94	1.12E+005
M 19	502.59	125.71	1.13E+004	204.82	4.64E+004
m 20	518.61	129.71	5.08E+004	277.43	5.06E+004
M 21	578.02	144.56	3.06E+003	144.55	4.11E+004
m 22	595.90	149.03	9.46E+003	264.57	8.58E+004
m 23	612.66	153.22	9.09E+002	112.74	8.35E+004
M 24	643.97	161.04	3.17E+003	610.87	5.18E+004
m 25	659.88	165.02	3.21E+003	543.73	7.48E+004
m 26	685.75	171.49	1.70E+003	313.69	6.87E+004
M 27	758.76	189.73	6.52E+002	216.06	2.38E+004
m 28	784.14	196.08	1.55E+003	371.21	3.89E+004
M 29	815.47	203.91	7.97E+003	205.21	2.90E+004
m 30	833.32	208.37	3.64E+004	661.95	2.58E+004
31	1024.00	256.02	1.11E+003	247.13	1.84E+004
M 32	1071.16	267.81	1.19E+003	103.39	1.44E+004
m 33	1087.00	271.77	6.09E+002	93.91	1.76E+004

	34	1200.67	300.17	1.49E+004	304.04	1.92E+004
	35	1247.99	312.00	8.60E+004	383.18	1.45E+004
	36	1293.00	323.25	2.59E+003	259.75	1.30E+004
M	37	1332.03	333.00	1.04E+004	234.39	8.04E+003
m	38	1363.25	340.81	1.10E+004	244.40	6.83E+003
m	39	1381.12	345.27	8.41E+003	194.60	6.12E+003
M	40	1474.43	368.59	3.38E+003	94.67	5.06E+003
m	41	1501.45	375.35	2.43E+004	400.84	4.52E+003
m	42	1522.01	380.48	4.48E+003	107.20	3.84E+003

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
M 43	1572.60	393.13	7.59E+003	225.62	3.61E+003
m 44	1595.08	398.75	3.11E+003	108.79	3.25E+003
M 45	1656.30	414.04	2.19E+004	141.88	3.07E+003
m 46	1677.34	419.30	1.60E+002	32.73	2.41E+003
m 47	1691.44	422.83	1.77E+003	49.75	2.29E+003
m 48	1707.19	426.76	5.39E+002	36.85	2.01E+003
49	1806.17	451.50	2.68E+003	123.28	2.43E+003
50	2044.00	510.94	8.66E+002	83.41	1.35E+003
51	2333.00	583.17	3.91E+002	51.29	6.36E+002
52	2439.00	609.66	3.27E+002	51.01	6.06E+002
53	2477.00	619.15	5.13E+002	61.99	7.01E+002
M 54	2559.88	639.87	1.22E+002	29.24	6.92E+002
m 55	2585.07	646.16	1.59E+002	32.75	9.23E+002
m 56	2612.12	652.92	3.61E+002	66.49	8.73E+002
57	2647.04	661.65	1.28E+004	134.17	8.37E+002
58	2755.00	688.63	1.59E+002	31.41	2.45E+002
59	2891.32	722.70	1.16E+003	48.32	2.93E+002
60	3078.00	769.35	1.44E+002	36.85	2.88E+002
61	3485.00	871.07	6.65E+001	26.67	1.76E+002
62	3647.00	911.56	2.04E+002	28.49	1.56E+002
63	3879.00	969.54	1.09E+002	23.55	1.37E+002
64	4005.00	1001.03	7.74E+001	22.98	1.12E+002
65	4486.00	1121.24	8.68E+001	25.33	1.41E+002
66	5102.00	1275.19	1.85E+002	27.86	1.35E+002
67	5849.00	1461.88	1.58E+003	44.81	7.24E+001
68	7066.00	1766.03	1.32E+002	15.09	2.10E+001

N U C L I D E I D E N T I F I C A T I O N R E P O R T

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	2.49232E-002	8.26788E-004
PA-234M	1.000	1001.03*	0.59	2.24973E-002	6.71166E-003
NP-237	1.000	300.17*	6.20	3.41865E-001	1.79180E-002
		312.00*	36.00	3.43609E-001	1.64997E-002
		340.60*	4.20	3.84960E-001	1.97721E-002
		129.28*	0.01	1.87206E+003	3.14489E+002
Pu-239	0.997	375.00*	0.00	2.31330E+003	1.82417E+002
		413.70*	0.00	2.23457E+003	1.75042E+002
		451.50* @	0.00	2.22523E+003	1.34392E+002
AM-241	1.000	59.54*	35.70	1.55138E+003	1.23408E+002
		125.28*	0.00	6.92015E+002	3.57861E+001
		335.40*	0.00	3.08062E+003	1.59816E+002
		662.42* @	0.00	5.89296E+003	1.94840E+002
PU-241	0.989	722.70*	0.00	1.48900E+003	7.71655E+001
		114.00*	0.02	2.20647E+002	1.55832E+001
		332.60*	0.00	5.27285E+002	2.73545E+001

I N T E R F E R E N C E C O R R E C T E D R E P O R T

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg )	Wt mean Activity Uncertainty
CS-137	1.000	2.109400E-002	8.343717E-004
PA-234M	1.000	2.249730E-002	6.711661E-003
NP-237	1.000	3.543451E-001	1.034401E-002
Pu-239 @	0.997	2.216722E+003	1.172016E+002
AM-241 @	1.000	9.053965E+002	3.094899E+001
PU-241	0.989	2.578080E+002	1.360226E+001

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

N U C L I D E T O T A L S

Nuclide	Mass (g)
Pu-239	3.44E+001 +/- 1.82E+000



C A N B E R R A I S O C S A N A L Y S I S

Report Generated On : 3/18/02 11:39:07 AM

Sample Title : 233s-01-0054 Side B  
 Spectrum Description :  
 Sample Identification : 1369  
 Sample Size : 961.8 kg

Sample Taken On : 3/14/02 2:17:00 PM  
 Acquisition Started : 3/14/02 2:18:03 PM

Live Time: 3600.0 seconds Real Time: 3704.3 seconds

ISOCS Calabration : 233S-01-0054S  
 Energy Calibration Used Done On : 2/27/01  
 Efficiency Calibration Used Done On : 3/18/02

P E A K A N A L Y S I S R E P O R T

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts	
	1	237.82	59.54	2.15E+006	1916.64	3.35E+005
M	2	281.14	70.37	8.86E+002	142.49	3.48E+004
m	3	292.22	73.14	1.70E+004	583.59	4.75E+004
m	4	300.90	75.31	2.98E+004	873.33	5.18E+004
	5	341.00	85.33	6.06E+003	559.91	8.43E+004
M	6	379.98	95.07	3.57E+004	459.39	1.05E+005
m	7	395.93	99.05	1.11E+005	1168.67	1.22E+005
m	8	404.60	101.22	1.54E+004	305.04	1.20E+005
m	9	413.97	103.56	6.21E+004	666.33	1.13E+005
M	10	445.51	111.45	2.61E+004	239.60	6.83E+004
m	11	460.68	115.24	2.29E+004	230.09	1.03E+005
M	12	502.56	125.70	1.15E+004	196.29	4.06E+004
m	13	518.63	129.72	5.68E+004	281.58	4.70E+004
M	14	578.27	144.62	4.71E+003	262.99	5.76E+004
m	15	595.82	149.01	1.29E+004	554.81	8.65E+004
m	16	612.38	153.15	2.22E+003	165.94	8.70E+004
M	17	644.41	161.16	3.27E+003	616.72	4.04E+004
m	18	659.81	165.00	2.79E+003	486.76	5.72E+004
m	19	685.93	171.53	1.49E+003	286.98	5.06E+004
	20	717.00	179.30	6.05E+002	245.20	2.26E+004
M	21	758.67	189.71	1.35E+003	312.39	2.94E+004
m	22	783.45	195.90	1.93E+003	406.50	3.91E+004
M	23	815.49	203.91	8.54E+003	240.62	2.61E+004
m	24	833.33	208.37	3.87E+004	881.68	2.34E+004
	25	1023.00	255.77	9.44E+002	206.79	1.39E+004
	26	1071.00	267.77	1.43E+003	196.67	1.24E+004
	27	1200.67	300.17	8.65E+003	211.72	1.16E+004
	28	1247.99	312.00	5.66E+004	304.73	1.00E+004
	29	1296.00	324.00	2.37E+003	280.38	1.36E+004
M	30	1332.07	333.02	1.06E+004	256.43	6.55E+003
m	31	1363.34	340.83	7.42E+003	189.69	5.83E+003
m	32	1381.05	345.26	8.95E+003	221.14	5.22E+003
M	33	1474.33	368.57	1.00E+004 9.25E+003	86.34 86.34	4.36E+003

m	34	1501.38	375.33	2.50E+004	362.13	3.75E+003
m	35	1522.04	380.49	5.00E+003	105.99	3.33E+003
M	36	1572.77	393.17	8.22E+003	92.43	2.95E+003
m	37	1595.04	398.73	2.13E+003	55.72	2.82E+003
M	38	1656.05	413.98	2.31E+004	280.71	1.99E+003
m	39	1676.76	419.16	1.46E+002	32.40	1.55E+003
m	40	1691.42	422.82	1.81E+003	56.51	1.49E+003
m	41	1707.55	426.85	4.00E+002	36.21	1.30E+003
	42	1806.17	451.50	2.66E+003	98.31	1.59E+003

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	2045.00	511.19	7.87E+002	88.19	1.24E+003
44	2335.00	583.66	2.97E+002	44.48	4.98E+002
45	2438.00	609.41	3.22E+002	40.08	4.09E+002
46	2476.00	618.90	3.69E+002	59.55	6.52E+002
M 47	2562.14	640.43	7.35E+001	17.22	3.56E+002
m 48	2584.86	646.11	1.70E+002	19.21	4.70E+002
m 49	2612.32	652.97	2.27E+002	20.35	4.11E+002
50	2647.04	661.65	5.66E+003	98.67	6.65E+002
51	2755.00	688.63	1.49E+002	32.05	2.42E+002
52	2891.32	722.70	9.07E+002	48.27	3.32E+002
53	3077.00	769.10	3.01E+002	46.48	3.10E+002
54	3647.00	911.56	2.29E+002	35.16	2.06E+002
55	3877.00	969.04	1.27E+002	24.55	1.35E+002
56	4484.00	1120.74	9.18E+001	24.73	1.43E+002
57	5101.00	1274.94	7.14E+001	25.35	1.31E+002
58	5849.00	1461.88	1.64E+003	47.48	1.03E+002
59	7066.00	1766.03	1.51E+002	16.66	2.64E+001

N U C L I D E I D E N T I F I C A T I O N R E P O R T

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	1.10238E-002	3.96620E-004
NP-237	1.000	300.17*	6.20	1.99170E-001	1.07747E-002
		312.00*	36.00	2.26113E-001	1.08792E-002
		340.60*	4.20	2.59623E-001	1.37330E-002
		129.28*	0.01	2.09441E+003	3.51806E+002
Pu-239	0.997	375.00*	0.00	2.37461E+003	1.86329E+002
		413.70*	0.00	2.35077E+003	1.85734E+002
		451.50* @	0.00	2.20255E+003	1.18742E+002
		59.54*	35.70	1.64920E+003	1.31188E+002
AM-241	1.000	125.28*	0.00	7.04115E+002	3.61612E+001
		335.40*	0.00	3.13472E+003	1.64967E+002
		662.42* @	0.00	2.60650E+003	9.35138E+001
		722.70*	0.00	1.16592E+003	7.16640E+001
PU-241	0.976	114.00*	0.02	3.06085E+002	1.68757E+001
		332.60*	0.00	5.36544E+002	2.82361E+001

I N T E R F E R E N C E C O R R E C T E D R E P O R T

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg )	Wt mean Activity Uncertainty
CS-137	1.000	7.389034E-003	4.165852E-004
NP-237	1.000	2.236809E-001	6.686760E-003
Pu-239	@ 0.997	2.329751E+003	1.232122E+002
AM-241	@ 1.000	8.594088E+002	3.093984E+001
PU-241	0.976	3.280250E+002	1.455262E+001

? = nuclide is part of an undetermined solution  
 X = nuclide rejected by the interference analysis  
 @ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

N U C L I D E T O T A L S

Nuclide	Mass (g)
Pu-239	3.61E+001 +/- 1.91E+000

\*\*\*\*\*  
 \*\*\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg )	Nuclide MDA (uCi/kg )	Activity (uCi/kg )
CO-60	1173.22	100.00	1.4460E-004	1.23E-004	6.7384E-005
	1332.49	100.00	1.2309E-004		7.4450E-005
CS-134	475.35	1.46	2.3539E-002	1.84E-004	-3.9627E-003
	563.23	8.38	3.2659E-003		-4.7313E-004
	569.32	15.43	1.7328E-003		-1.0147E-003
	604.70	97.60	3.0509E-004		-1.0027E-004
	795.84	85.40	1.8436E-004		-6.5380E-005
	801.93	8.73	1.8452E-003		-1.6611E-003
	1038.57	1.00	1.4596E-002		-2.9518E-003
	1167.94	1.80	8.0424E-003		7.2909E-003
	1365.15	3.04	3.7032E-003		1.6449E-003
	+ CS-137	661.65*	85.12		4.1440E-004
+ NP-237	300.17*	6.20	1.4462E-002	2.51E-003	1.9917E-001
	312.00*	36.00	2.5143E-003		2.2611E-001
	340.60*	4.20	1.2517E-002		2.5962E-001
+ Pu-239	129.28*	0.01	3.7270E+001	2.14E+001	2.0944E+003
	375.00*	0.00	2.7365E+001		2.3746E+003
	413.70*	0.00	2.1390E+001		2.3508E+003
	451.50*	0.00	2.3071E+002		2.2025E+003
+ AM-241	59.54*	35.70	3.1257E+000	3.13E+000	1.6492E+003
	125.28*	0.00	5.7683E+001		7.0411E+002
	335.40*	0.00	1.1184E+002		3.1347E+003
	662.42*	0.00	9.7984E+001		2.6065E+003
	722.70*	0.00	1.6303E+002		1.1659E+003
+ PU-241	114.00*	0.02	2.0024E+001	1.91E+001	3.0609E+002
	332.60*	0.00	1.9143E+001		5.3654E+002
CM-243	209.70	3.27	5.9588E-002	8.13E-003	1.4011E-002
	228.18	10.56	1.2376E-002		3.1930E-003
	277.60	14.00	8.1322E-003		-9.1124E-003

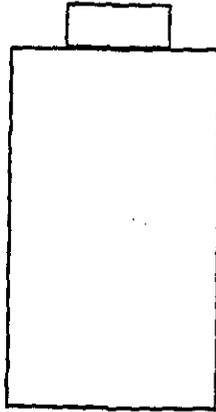
+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

**Bldg 233-S**  
**NDA Item Description Sheet**  
**Bottle or Cylinder Geometry**



Put Dimensions on Bottle

Item ID: 233S-01-0022

Weight (kg): 355 LBS 160 kg

Material Description: PALLETS

Packaging: DRUM

Detector Distance (in): 24

Detector Filters: None

Dose Rate: 1.5

Comments: HIGH ENERGY WIAL 1800 1377

GROSS 355 7690  
58  
297 LBS NET  
135 kg  
164338

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0022  
 File Name: 1377

Assay Date: 18-Mar-02  
 File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	6.53E+01	6.99E+00
Am-241	3.43E+01	2.98E+00
Np-237	7.93E-02	3.89E-03
U-238		
U-235		
Cs-137	5.72E-04	6.33E-05
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5  
 Weight (lbs): 297

Width (in): 22.5  
 Depth for TMU (in): 4

Depth (in): 22.5  
 % Volume: 50

Am-241 Calcs:

Measured	3.43E+01	+/-	3.43E+02	Calc from Pu-239
Calculated	9.03E+01	+/-	1.84E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	2.64E+01	+/-	2.15E+01
Pu-239	6.53E+01	+/-	5.31E+01
Pu-240	3.40E+01	+/-	2.77E+01
Pu-241	1.27E+02	+/-	1.03E+02
Pu-242	3.43E-02	+/-	2.79E-02
Am-241	9.03E+01	+/-	1.84E+02
Np-237	7.93E-02	+/-	6.41E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	5.72E-04	+/-	4.65E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

<b>Total TRU Activity(nCi/g):</b>	2.16E+02	+/-	1.94E+02	Calc from Pu-239 Act
<b>Pu (g):</b>	1.64E-01	<b>Pu (g) + 3 sigma TMU:</b>	5.64E-01	
		<b>Pu(g) + 3 sigma:</b>	2.17E-01	

Comments:

High NP-237 ratio does not affect final result  
 Errors: High Np-237 ratio,

Analyst:

Martin Winterrose

Date: 3/25/02

#Date & Time: Mon Mar 25 12:49:04 2002

-g=SIMPLE\_CYLINDER  
-description=233S-01-0022  
-comment=DRUM\_WITH\_SAMPLES  
-Collimator=50MM-180D  
-crpn=4  
-Detector=7219  
-Convergence in %=1 ~MDRPN=4  
-Lunit=IN ~Tunit=C ~Dunit=G/CU.C ~Punit=MM.HG  
-at=20 ~ap=760 ~rh=50  
-Energies kev= 50.000, 100.000, 128.000, 130.000, 150.000, 200.000,#  
300.000, 500.000, 700.000, 1000.000, 1400.000, 2000.000,#  
4000.000,  
-Error in %= 10.000, 10.000, 10.000, 10.000, 10.000, 8.000,#  
8.000, 6.000, 6.000, 4.000, 4.000, 4.000,#  
4.000,  
-d1.1=0.0416 ~d1.2=22.5 ~d1.3=33.5 ~lmater=CSTEEL ~lden=7.86  
-d3.1=33 ~3mater=SAMPLEHS ~3den=0.85 ~3con=1  
-sd1=24

C A N B E R R A      I S O C S      A N A L Y S I S

Report Generated On : 3/25/02 12:50:55 PM

Sample Title : 233s-01-0022

Spectrum Description :

Sample Identification : 1377

Sample Size : 135.0 kg

Sample Taken On : 3/19/02 10:55:00 AM

Acquisition Started : 3/19/02 10:56:04 AM

Live Time: 1800.0 seconds      Real Time: 1810.4 seconds

ISOCS Calabration : 233S-01-0022

Energy Calibration Used Done On : 2/27/01

Efficiency Calibration Used Done On : 3/25/02

P E A K      A N A L Y S I S      R E P O R T

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.14	59.87	1.94E+005	6732.03	4.56E+003
2	339.56	84.97	7.63E+002	139.00	4.13E+003
3	369.87	92.54	2.66E+002	68.90	4.20E+003
4	379.64	94.98	1.07E+003	80.86	4.21E+003
5	395.44	98.93	2.36E+003	102.60	4.21E+003
6	445.63	111.48	7.05E+002	66.98	4.38E+003
7	459.13	114.85	3.44E+002	65.98	4.31E+003
8	502.19	125.61	3.39E+002	66.10	4.02E+003
9	518.25	129.63	9.54E+002	63.57	3.88E+003
10	833.47	208.41	3.89E+002	35.91	1.19E+003
11	1201.18	300.30	1.60E+003	55.79	4.65E+002
12	1248.30	312.08	9.35E+003	99.73	3.39E+002
13	1332.00	333.00	8.84E+001	17.94	2.78E+002
14	1362.64	340.65	1.03E+003	42.71	2.56E+002
15	1408.39	352.09	1.26E+002	17.44	2.01E+002
16	1501.20	375.28	4.39E+002	25.02	1.81E+002
17	1594.69	398.65	2.88E+002	20.99	1.59E+002
18	1655.79	413.92	2.97E+002	21.79	1.38E+002
19	1663.40	415.82	3.78E+002	23.72	1.34E+002
20	1808.31	452.03	4.32E+001	11.89	1.05E+002
21	2044.58	511.08	1.35E+002	14.77	7.59E+001
22	2437.34	609.24	1.38E+002	14.39	5.56E+001
23	2647.33	661.72	1.28E+002	13.61	4.75E+001
24	3645.52	911.19	8.21E+001	11.37	3.22E+001
25	5846.24	1461.19	5.48E+002	24.03	7.54E+000
26	7064.29	1765.60	5.74E+001	8.57	1.36E+000

N U C L I D E   I D E N T I F I C A T I O N   R E P O R T

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	5.71880E-004	6.33294E-005
NP-237	1.000	300.17*	6.20	7.79108E-002	4.64144E-003
		312.00*	36.00	7.93258E-002	3.88567E-003
		340.60*	4.20	7.64457E-002	4.75939E-003
		415.76*	1.75	7.18522E-002	5.39313E-003
Pu-239	0.996	129.28*	0.01	6.03217E+001	1.08974E+001
		413.70*	0.00	6.52565E+001	6.98599E+000
		451.50* @	0.00	7.77327E+001	2.16246E+001
AM-241	0.996	59.54*	35.70	3.43270E+001	2.97743E+000
		125.28*	0.00	3.47506E+001	6.97411E+000
		335.40	0.00		
		662.42* @	0.00	1.35218E+002	1.49694E+001
PU-241	0.974	722.70	0.00		
		114.00*	0.02	7.05144E+000	1.40627E+000
		332.60*	0.00	9.50043E+000	1.97842E+000

I N T E R F E R E N C E   C O R R E C T E D   R E P O R T

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg )	Wt mean Activity Uncertainty
CS-137	1.000	4.264242E-004	6.436105E-005
NP-237	1.000	7.697314E-002	2.287075E-003
Pu-239	@ 0.996	6.381913E+001	5.881237E+000
AM-241	@ 0.996	3.439233E+001	2.738317E+000
PU-241	0.974	7.873459E+000	1.146216E+000

? = nuclide is part of an undetermined solution  
X = nuclide rejected by the interference analysis  
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

N U C L I D E   T O T A L S

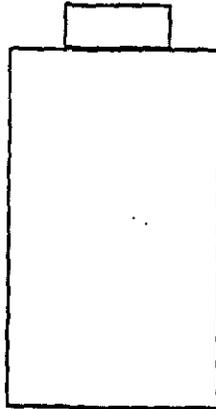
Nuclide	Mass (g)
Pu-239	1.39E-001 +/- 1.28E-002

\*\*\*\*\*  
 \*\*\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg )	Nuclide MDA (uCi/kg )	Activity (uCi/kg )
	CO-60	1173.22	100.00	2.2061E-004	1.67E-004	-1.7190E-004
		1332.49	100.00	1.6659E-004		-7.6585E-005
	CS-134	475.35	1.46	1.9159E-002	2.83E-004	3.2461E-003
		563.23	8.38	2.8890E-003		7.8857E-004
		569.32	15.43	1.5777E-003		-4.2230E-004
		604.70	97.60	3.3585E-004		-2.5047E-005
		795.84	85.40	2.8282E-004		1.2952E-004
		801.93	8.73	2.6672E-003		-2.1861E-003
		1038.57	1.00	2.1021E-002		-2.4013E-002
		1167.94	1.80	1.2071E-002		-5.4294E-003
		1365.15	3.04	5.3760E-003		3.0037E-003
+	CS-137	661.65*	85.12	1.5512E-004	1.55E-004	5.7188E-004
+	NP-237	300.17*	6.20	5.0312E-003	7.50E-004	7.7911E-002
		312.00*	36.00	7.4976E-004		7.9326E-002
		340.60*	4.20	5.7429E-003		7.6446E-002
		415.76*	1.75	1.0766E-002		7.1852E-002
+	Pu-239	129.28*	0.01	1.8499E+001	1.26E+001	6.0322E+001
		413.70*	0.00	1.2591E+001		6.5256E+001
		451.50*	0.00	9.0899E+001		7.7733E+001
+	AM-241	59.54*	35.70	5.6191E-002	5.62E-002	3.4327E+001
		125.28*	0.00	3.0465E+001		3.4751E+001
		335.40	0.00	1.0470E+002		2.4355E+001
		662.42*	0.00	3.6678E+001		1.3522E+002
		722.70	0.00	1.9467E+002		-1.3982E+001
+	PU-241	114.00*	0.02	6.3194E+000	6.32E+000	7.0514E+000
		332.60*	0.00	8.6230E+000		9.5004E+000
	CM-243	209.70	3.27	2.4235E-002	4.43E-003	-1.5362E-002
		228.18	10.56	6.5347E-003		3.2557E-003
		277.60	14.00	4.4273E-003		-7.3655E-003

+ = Nuclide identified during the nuclide identification  
 \* = Energy line found in the spectrum  
 > = MDA value not calculated  
 @ = Half-life too short to be able to perform the decay correction

**Bldg 233-S**  
**NDA Item Description Sheet**  
**Bottle or Cylinder Geometry**



6247

Put Dimensions on Bottle

Item ID: 2335-01-0087

Weight (kg): 356 LBS 162 KG

Material Description: PACIASE

Packaging: DRUM

Detector Distance (in): 24

Detector Filters: NRN15

Dose Rate: \_\_\_\_\_

Comments: \_\_\_\_\_ 1800 1373

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

162  
24.808  
135.69  
298.52 LBS  
135.46 KG

**233-S Item Analysis**

Spreadsheet Version 3.0b

1/14/02

**Sample Info:**

Item ID:   
 File Name:

Assay Date:   
 File Name:

**Data Input:**

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	3.17E+02	2.61E+01
Am-241	6.30E+01	5.61E+00
Np-237	9.99E-02	4.88E-03
U-238		
U-235		
Cs-137	1.13E-03	7.89E-05
Co-60		

Activity (uCi/kg)	Meas Uncert

**Item Parameters:**

Contamination:

Item Type:

Calcs:

**Dimensions:**

Length (in):

Width (in):

Depth (in):

Weight (lbs):

Depth for TMU (in):

% Volume:

**Am-241 Calcs:**

Measured	6.30E+01	+/-	6.31E+02	Use Meas
Calculated	4.39E+02	+/-	8.90E+02	

**Nuclide Activities:**

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.28E+02	+/-	1.04E+02
Pu-239	3.17E+02	+/-	2.57E+02
Pu-240	1.65E+02	+/-	1.34E+02
Pu-241	6.17E+02	+/-	5.00E+02
Pu-242	1.67E-01	+/-	1.35E-01
Am-241	6.30E+01	+/-	6.31E+02
Np-237	9.99E-02	+/-	8.07E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	1.13E-03	+/-	9.11E-04
Co-60	0.00E+00	+/-	0.00E+00

**Results:**

<b>Total TRU Activity(nCi/g):</b>	6.74E+02	+/-	7.02E+02	Calc from Pu-239 Act
<b>Pu (g):</b>	8.01E-01	<b>Pu (g) + 3 sigma TMU:</b>	2.75E+00	
		<b>Pu(g) + 3 sigma:</b>	9.98E-01	

**Comments:**

Am-241 from 722 keV peak.	Errors:
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**Analyst:**

**Date:**

#Date & Time: Mon Mar 18 14:05:20 2002  
~g=SIMPLE\_CYLINDER  
~description=233S-01-0087  
~comment=DRUM\_WITH\_SAMPLES  
~Ccollimator=50MM-180D  
~crpn=4  
~Detector=7219  
~Convergence in %=1 ~MDRPN=4  
~Lunit=IN ~Tunit=C ~Dunit=G/CU.C ~Punit=MM.HG  
~at=20 ~ap=760 ~rh=50  
~Energies kev= 50.000, 100.000, 128.000, 130.000, 150.000, 200.000,#  
300.000, 500.000, 700.000, 1000.000, 1400.000, 2000.000,#  
4000.000,  
~Error in %= 10.000, 10.000, 10.000, 10.000, 10.000, 8.000,#  
8.000, 6.000, 6.000, 4.000, 4.000, 4.000,#  
4.000,  
~d1.1=0.0416 ~d1.2=22.5 ~d1.3=33.5 ~lmater=CSTEEL ~lden=7.86  
~d3.1=33 ~3mater=SAMPLEHS ~3den=0.6247 ~3con=1  
~sd1=24

C A N B E R R A      I S O C S      A N A L Y S I S

Report Generated On : 3/18/02 2:37:40 PM

Sample Title : 233s-01-0087

Spectrum Description :

Sample Identification : 1373

Sample Size : 135.7 kg

Sample Taken On : 3/18/02 2:06:00 PM

Acquisition Started : 3/18/02 2:07:05 PM

Live Time: 1800.0 seconds      Real Time: 1826.1 seconds

ISOCS Calabration : 233S-01-0087

Energy Calibration Used Done On : 2/27/01

Efficiency Calibration Used Done On : 3/18/02

P E A K      A N A L Y S I S      R E P O R T

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.11	59.86	4.83E+005	19419.3	1.07E+004
2	292.78	73.28	2.36E+003	171.18	7.58E+003
3	300.90	75.30	4.46E+003	161.95	7.69E+003
4	340.21	85.13	1.90E+003	117.91	8.09E+003
5	349.36	87.42	1.01E+003	111.33	8.14E+003
6	379.33	94.91	1.58E+003	102.31	8.20E+003
7	395.77	99.02	5.27E+003	163.77	8.15E+003
8	413.64	103.48	2.63E+003	149.44	8.07E+003
9	445.58	111.46	1.27E+003	99.96	8.37E+003
10	460.10	115.09	7.45E+002	101.47	8.21E+003
11	502.73	125.75	9.53E+002	84.37	7.69E+003
12	518.56	129.70	3.77E+003	100.35	7.47E+003
13	575.51	143.94	1.99E+002	71.09	6.63E+003
14	816.32	204.12	4.58E+002	55.56	3.51E+003
15	833.20	208.34	1.76E+003	59.93	3.34E+003
16	1201.35	300.34	2.50E+003	64.60	1.37E+003
17	1248.41	312.11	1.52E+004	152.72	1.02E+003
18	1332.02	333.00	7.51E+002	38.33	7.60E+002
19	1343.06	335.76	3.20E+002	32.57	7.38E+002
20	1362.85	340.71	1.73E+003	117.01	6.86E+002
21	1378.00	344.49	2.90E+002	80.95	6.42E+002
22	1473.22	368.29	2.41E+002	25.54	4.58E+002
23	1501.19	375.28	2.24E+003	52.52	4.21E+002
24	1521.98	380.48	3.89E+002	28.82	3.87E+002
25	1531.65	382.89	3.11E+002	25.76	3.79E+002
26	1572.45	393.09	6.53E+002	30.91	3.08E+002
27	1594.67	398.64	5.46E+002	28.69	2.81E+002
28	1655.66	413.89	1.85E+003	47.22	1.98E+002
29	1663.26	415.78	7.01E+002	32.43	1.84E+002
30	1690.99	422.71	1.51E+002	17.71	1.59E+002
31	1806.65	451.62	2.36E+002	19.46	1.33E+002
32	2044.15	510.98	1.68E+002	16.57	9.62E+001
33	2437.09	609.18	1.98E+002	14.73 <sup>48</sup>	7.57E+001

34	2648.47	662.01	3.17E+002	19.81	5.90E+001
35	2888.75	722.06	6.76E+001	11.07	4.71E+001
36	3644.63	910.97	6.92E+001	10.65	3.30E+001
37	5846.70	1461.30	5.44E+002	24.00	8.34E+000
38	7062.93	1765.26	4.10E+001	7.46	8.93E-001

N U C L I D E   I D E N T I F I C A T I O N   R E P O R T

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.995	661.65*	85.12	1.12663E-003	7.89186E-005
NP-237	0.999	300.17*	6.20	9.42888E-002	5.16010E-003
		312.00*	36.00	9.99133E-002	4.88064E-003
		340.60*	4.20	1.00057E-001	8.19779E-003
		375.00*	0.68	8.28322E-001	4.13403E-002
		415.60*	1.75	1.04249E-001	6.45910E-003
Pu-239	0.995	129.28*	0.01	1.78229E+002	3.02994E+001
		375.00*	0.00	3.55969E+002	2.86869E+001
		413.70*	0.00	3.17421E+002	2.60727E+001
		451.50* @	0.00	3.33952E+002	3.04390E+001
AM-241	0.996	59.54*	35.70	6.30299E+001	5.61318E+000
		125.28*	0.00	7.28473E+001	7.35121E+000
		335.40*	0.00	1.56196E+002	1.74865E+001
		662.42* @	0.00	2.66386E+002	1.86460E+001
		722.70*	0.00	1.61917E+002	2.69709E+001
PU-241	0.958	114.00*	0.02	1.13477E+001	1.66370E+000
		332.60*	0.00	6.26136E+001	4.33314E+000

I N T E R F E R E N C E   C O R R E C T E D   R E P O R T

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg )	Wt mean Activity Uncertainty
CS-137	0.995	8.121065E-004	8.089974E-005
NP-237	0.999	9.993900E-002	2.900411E-003
Pu-239	@ 0.995	2.336139E+002	7.399037E+000
AM-241	@ 0.996	7.436745E+001	4.268367E+000
PU-241	0.958	1.793414E+001	1.553156E+000

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

\*\*\*\*\*  
 \*\*\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg )	Nuclide MDA (uCi/kg )	Activity (uCi/kg )
	CO-60	1173.22	100.00	1.9158E-004	1.39E-004	8.4310E-005
		1332.49	100.00	1.3896E-004		-2.0679E-005
	CS-134	475.35	1.46	1.6281E-002	2.16E-004	-8.1678E-003
		563.23	8.38	2.6637E-003		1.6284E-003
		569.32	15.43	1.4297E-003		6.2749E-004
		604.70	97.60	2.7736E-004		-1.5615E-004
		795.84	85.40	2.1611E-004		1.1092E-004
		801.93	8.73	2.0672E-003		-6.4246E-004
		1038.57	1.00	1.7307E-002		-1.9310E-002
		1167.94	1.80	1.0183E-002		-8.7909E-003
		1365.15	3.04	4.5324E-003		-3.1088E-003
+	CS-137	661.65*	85.12	1.3686E-004	1.37E-004	1.1266E-003
+	NP-237	300.17*	6.20	6.6005E-003	9.92E-004	9.4289E-002
		312.00*	36.00	9.9177E-004		9.9913E-002
		340.60*	4.20	7.1966E-003		1.0006E-001
		375.00*	0.68	3.6224E-002		8.2832E-001
		415.60*	1.75	9.7932E-003		1.0425E-001
+	Pu-239	129.28*	0.01	1.9151E+001	1.17E+001	1.7823E+002
		375.00*	0.00	1.5567E+001		3.5597E+002
		413.70*	0.00	1.1686E+001		3.1742E+002
		451.50*	0.00	7.9513E+001		3.3395E+002
+	AM-241	59.54*	35.70	6.3203E-002	6.32E-002	6.3030E+001
		125.28*	0.00	3.1393E+001		7.2847E+001
		335.40*	0.00	6.2999E+001		1.5620E+002
		662.42*	0.00	3.2360E+001		2.6639E+002
		722.70*	0.00	8.2941E+001		1.6192E+002
+	PU-241	114.00*	0.02	6.4618E+000	6.46E+000	1.1348E+001
		332.60*	0.00	1.0914E+001		6.2614E+001
	CM-243	209.70	3.27	3.1779E-002	5.89E-003	9.5319E-002
		228.18	10.56	8.1517E-003		1.6923E-003
		277.60	14.00	5.8902E-003		-8.0806E-003

+ = Nuclide identified during the nuclide identification  
 \* = Energy line found in the spectrum  
 > = MDA value not calculated  
 @ = Half-life too short to be able to perform the decay correction

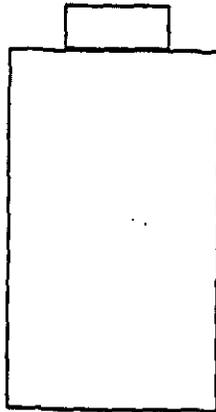
N U C L I D E T O T A L S

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Nuclide	Mass (g)
Pu-239	5.11E-001 +/- 1.62E-002

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**Bldg 233-S**  
**NDA Item Description Sheet**  
**Bottle or Cylinder Geometry**



Put Dimensions on Bottle

Item ID: 2335-01-0112 154.64  
Weight (kg): 398 LBS 180.9 kg 340 LBS  
.7080

Material Description: Packages

Packaging: Drum

Detector Distance (in): 24"

Detector Filters: None

Dose Rate: 4.5

Comments: 1800 1378

*Chow  
828*

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID:   
 File Name:

Assay Date:   
 File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	7.89E+01	7.77E+00
Am-241	7.70E+01	2.29E+01
Np-237	4.11E-02	2.05E-03
U-238		
U-235		
Cs-137	5.01E-04	1.20E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination:

Item Type:

Calcs:

Dimensions:

Length (in):   
 Weight (lbs):

Width (in):   
 Depth for TMU (in):

Depth (in):   
 % Volume:

Am-241 Calcs:

Measured	7.70E+01	+/-	7.71E+02	Calc from Pu-239
Calculated	1.09E+02	+/-	2.22E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	3.20E+01	+/-	2.60E+01
Pu-239	7.89E+01	+/-	6.41E+01
Pu-240	4.11E+01	+/-	3.34E+01
Pu-241	1.54E+02	+/-	1.25E+02
Pu-242	4.15E-02	+/-	3.37E-02
Am-241	1.09E+02	+/-	2.22E+02
Np-237	4.11E-02	+/-	3.32E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	5.01E-04	+/-	4.21E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	2.61E+02	+/-	2.35E+02	Calc from Pu-239 Act
Pu (g):	2.27E-01	Pu (g) + 3 sigma TMU:	7.80E-01	
		Pu(g) + 3 sigma:	2.94E-01	

Comments:

Np-237 ratio is just above limit and does not affect final value. Am-241 from 722 keV peak

Errors: High Np-237 ratio,

Analyst:

Date:

#Date & Time: Mon Mar 25 13:47:30 2002  
~g=SIMPLE\_CYLINDER  
~description=233S-01-0112  
~comment=DRUM\_WITH\_SAMPLES  
~Ccollimator=50MM-180D  
~crpn=4  
~Detector=7219  
~Convergence in %=1 ~MDRPN=4  
~Lunit=IN ~Tunit=C ~Dunit=G/CU.C ~Punit=MM.HG  
~at=20 ~ap=760 ~rh=50  
~Energies kev= 50.000, 100.000, 128.000, 130.000, 150.000, 200.000, #  
300.000, 500.000, 700.000, 1000.000, 1400.000, 2000.000, #  
4000.000,  
~Error in %= 10.000, 10.000, 10.000, 10.000, 10.000, 8.000, #  
8.000, 6.000, 6.000, 4.000, 4.000, 4.000, #  
4.000,  
~d1.1=0.0416 ~d1.2=22.5 ~d1.3=33.5 ~lmater=CSTEEL ~lden=7.86  
~d3.1=33 ~3mater=SAMPLEMS ~3den=0.725 ~3con=1  
~sd1=24

C A N B E R R A I S O C S A N A L Y S I S

Report Generated On : 3/25/02 1:51:01 PM

Sample Title : 233s-01-0112  
 Spectrum Description :  
 Sample Identification : 1378  
 Sample Size : 154.5 kg

Sample Taken On : 3/19/02 12:39:00 PM  
 Acquisition Started : 3/19/02 12:40:16 PM

Live Time: 1800.0 seconds Real Time: 1813.3 seconds

ISOCS Calabration : 233S-01-0112  
 Energy Calibration Used Done On : 2/27/01  
 Efficiency Calibration Used Done On : 3/25/02

P E A K A N A L Y S I S R E P O R T

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.15	59.87	2.97E+005	10360.4	5.20E+003
2	340.55	85.21	6.55E+002	144.95	3.96E+003
3	379.55	94.96	7.72E+002	71.91	4.00E+003
4	395.77	99.02	2.60E+003	100.87	3.98E+003
5	413.68	103.49	1.26E+003	88.70	3.93E+003
6	445.82	111.52	7.26E+002	67.14	4.05E+003
7	464.58	116.21	1.88E+002	67.65	3.94E+003
8	502.63	125.72	4.17E+002	63.41	3.64E+003
9	518.50	129.69	1.49E+003	66.47	3.50E+003
10	833.10	208.31	6.27E+002	36.85	9.30E+002
11	1201.03	300.27	9.27E+002	36.81	3.98E+002
12	1248.27	312.07	5.49E+003	77.12	3.15E+002
13	1331.81	332.95	2.17E+002	21.68	2.56E+002
14	1342.82	335.70	1.03E+002	19.20	2.51E+002
15	1362.44	340.61	6.07E+002	29.73	2.37E+002
16	1381.93	345.47	1.22E+002	17.75	2.25E+002
17	1501.19	375.28	5.88E+002	27.92	1.68E+002
18	1521.78	380.43	6.93E+001	17.36	1.64E+002
19	1572.68	393.15	1.31E+002	16.57	1.55E+002
20	1594.75	398.66	1.80E+002	18.05	1.51E+002
21	1655.50	413.84	4.07E+002	24.44	1.36E+002
22	1663.10	415.74	1.81E+002	18.83	1.33E+002
23	1807.21	451.76	5.96E+001	12.44	9.64E+001
24	2043.10	510.71	1.43E+002	15.26	6.93E+001
25	2438.02	609.41	1.19E+002	13.77	6.17E+001
26	2646.89	661.61	1.27E+002	30.11	4.61E+001
27	2649.50	662.26	6.84E+001	33.05	4.59E+001
28	2889.09	722.14	2.92E+001	8.62	3.81E+001
29	3645.75	911.25	7.48E+001	10.57	3.08E+001
30	5845.82	1461.08	5.51E+002	24.07	7.34E+000
31	7063.81	1765.48	3.89E+001	7.40	1.80E+000

N U C L I D E   I D E N T I F I C A T I O N   R E P O R T

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	5.00578E-004	1.19715E-004
NP-237	1.000	300.17*	6.20	3.98435E-002	2.48960E-003
		312.00*	36.00	4.10731E-002	2.04656E-003
		340.60*	4.20	3.98929E-002	2.68912E-003
		415.76*	1.75	3.03706E-002	3.40242E-003
Pu-239	0.995	129.28*	0.01	7.97376E+001	1.38521E+001
		413.70*	0.00	7.88783E+001	7.77092E+000
		451.50* @	0.00	9.48046E+001	2.01477E+001
AM-241	0.996	59.54*	35.70	4.13416E+001	3.58816E+000
		125.28*	0.00	3.59580E+001	5.74319E+000
		335.40*	0.00	5.70850E+001	1.09840E+001
		662.42* @	0.00	6.37651E+001	3.08743E+001
		722.70*	0.00	7.70482E+001	2.28693E+001

I N T E R F E R E N C E   C O R R E C T E D   R E P O R T

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg )	Wt mean Activity Uncertainty
CS-137	1.000	5.005777E-004	1.197152E-004
NP-237	1.000	3.901454E-002	1.265152E-003
Pu-239	@ 0.995	7.908397E+001	6.777305E+000
AM-241	@ 0.996	4.164236E+001	2.908789E+000

? = nuclide is part of an undetermined solution  
X = nuclide rejected by the interference analysis  
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

N U C L I D E   T O T A L S

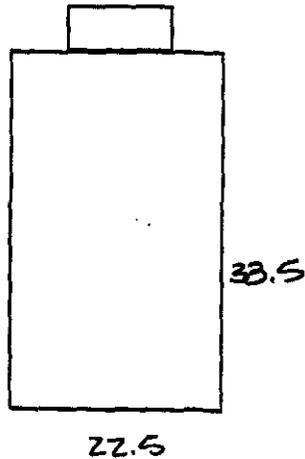
Nuclide	Mass (g)
Pu-239	1.97E-001 +/- 1.69E-002

\*\*\*\*\*  
 \*\*\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg )	Nuclide MDA (uCi/kg )	Activity (uCi/kg )
	CO-60	1173.22	100.00	1.9173E-004	1.54E-004	7.0252E-005
		1332.49	100.00	1.5443E-004		-6.6984E-005
	CS-134	475.35	1.46	1.7006E-002	2.40E-004	8.5662E-004
		563.23	8.38	2.6691E-003		5.4198E-005
		569.32	15.43	1.4838E-003		-1.3624E-003
		604.70	97.60	2.8839E-004		4.8005E-005
		795.84	85.40	2.3951E-004		-7.1485E-005
		801.93	8.73	2.3633E-003		-2.0757E-003
		1038.57	1.00	1.9055E-002		8.8443E-004
		1167.94	1.80	1.0486E-002		-1.0470E-004
		1365.15	3.04	5.0381E-003		4.3066E-003
+	CS-137	661.65*	85.12	1.3525E-004	1.35E-004	5.0058E-004
+	NP-237	300.17*	6.20	4.1062E-003	6.37E-004	3.9843E-002
		312.00*	36.00	6.3725E-004		4.1073E-002
		340.60*	4.20	4.8826E-003		3.9893E-002
		415.76*	1.75	9.4723E-003		3.0371E-002
+	Pu-239	129.28*	0.01	1.4862E+001	1.10E+001	7.9738E+001
		413.70*	0.00	1.1043E+001		7.8878E+001
		451.50*	0.00	7.7031E+001		9.4805E+001
+	AM-241	59.54*	35.70	4.7132E-002	4.71E-002	4.1342E+001
		125.28*	0.00	2.4469E+001		3.5958E+001
		335.40*	0.00	4.2438E+001		5.7085E+001
		662.42*	0.00	3.1919E+001		6.3765E+001
		722.70*	0.00	8.2922E+001		7.7048E+001
	PU-241	114.00	0.02	9.2041E+000	9.20E+000	2.4643E+001
		332.60	0.00	1.4574E+001		4.0511E+000
	CM-243	209.70	3.27	1.9936E-002	3.37E-003	4.1378E-002
		228.18	10.56	4.8999E-003		-1.4075E-003
		277.60	14.00	3.3689E-003		-6.9841E-004

+ = Nuclide identified during the nuclide identification  
 \* = Energy line found in the spectrum  
 > = MDA value not calculated  
 @ = Half-life too short to be able to perform the decay correction

**Bldg 233-S**  
**NDA Item Description Sheet**  
**Bottle or Cylinder Geometry**



Put Dimensions on Bottle

NET  
245 LBS  
111.36 KG  
0.6809

Item ID: 2335-01-0115

Weight (kg): 303 lbs 137 kg

Material Description: Package 110 Drum

Packaging: DRUM

Detector Distance (in): 24"

Detector Filters: NONE

Dose Rate: \_\_\_\_\_

Comments: A 1800 1390

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: **233s-01-0115**  
 File Name: **1390**

Assay Date: **27-Mar-02**  
 File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	4.27E+02	3.48E+01
Am-241	4.75E+02	4.07E+01
Np-237	3.39E-02	1.72E-03
U-238		
U-235		
Cs-137	1.56E-03	1.04E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: **Internal**

Item Type: **Barrel**

Calcs: **Use 1st**

Dimensions:

Length (in): **33.5**  
 Weight (lbs): **245**

Width (in): **22.5**  
 Depth for TMU (in): **4**

Depth (in): **22.5**  
 % Volume: **50**

Am-241 Calcs:

Measured	4.75E+02	+/-	1.44E+03	Calc from Pu-239
Calculated	5.91E+02	+/-	6.40E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.73E+02	+/-	7.28E+01
Pu-239	4.27E+02	+/-	1.80E+02
Pu-240	2.22E+02	+/-	9.36E+01
Pu-241	8.32E+02	+/-	3.50E+02
Pu-242	2.25E-01	+/-	9.46E-02
Am-241	5.91E+02	+/-	6.40E+02
Np-237	3.39E-02	+/-	1.41E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	1.56E-03	+/-	6.52E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

<b>Total TRU Activity(nCi/g):</b>	1.41E+03	+/-	6.75E+02	Calc from Pu-239 Act
<b>Pu (g):</b>	8.85E-01	<b>Pu (g) + 3 sigma TMU:</b>	2.00E+00	
		<b>Pu(g) + 3 sigma:</b>	1.10E+00	

Comments:

**Errors:**

Analyst:

**Martin Winterrose**

Date:

**4/4/02**

```
#Date & Time: Wed Mar 27 12:20:33 2002
~g=SIMPLE_CYLINDER
~description=233S-01-0115RP
~comment=DRUM WITH SAMPLES
~Collimator=50MM-180D
~crpn=4
~Detector=7219
~Convergence in %=1          ~MDRPN=4
~Lunit=IN  ~Tunit=C  ~Dunit=G/CU.C  ~Punit=MM.HG
~at=20      ~ap=760      ~rh=50
~Energies kev= 50.000, 100.000, 128.000, 130.000, 150.000, 200.000,#
                300.000, 500.000, 700.000, 1000.000, 1400.000, 2000.000,#
                4000.000,
~Error in %= 10.000, 10.000, 10.000, 10.000, 10.000, 8.000,#
              8.000, 6.000, 6.000, 4.000, 4.000, 4.000,#
              4.000,
~d1.1=0.0416  ~d1.2=22.5      ~d1.3=33.5      ~lmater=CSTEEL  ~lden=7.86
~d3.1=33      ~3mater=SAMPLEHS  ~3den=0.6309    ~3con=1
~sdl=24
```

C A N B E R R A I S O C S A N A L Y S I S

Report Generated On : 3/27/02 12:54:21 PM

Sample Title : 233s-01-0115 RP  
 Spectrum Description :  
 Sample Identification : 1390  
 Sample Size : 111.4 kg

Sample Taken On : 3/27/02 12:22:00 PM  
 Acquisition Started : 3/27/02 12:22:29 PM

Live Time: 1800.0 seconds Real Time: 1902.6 seconds

ISOCs Calibration : 233S-01-0115R  
 Energy Calibration Used Done On : 2/27/01  
 Efficiency Calibration Used Done On : 3/27/02

P E A K A N A L Y S I S R E P O R T

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.15	59.87	2.96E+006	94851.1	5.38E+004
2	291.93	73.06	1.84E+003	108.10	1.93E+004
3	300.91	75.31	3.56E+003	136.79	1.81E+004
4	339.93	85.06	1.65E+003	111.97	1.40E+004
5	348.22	87.13	6.41E+002	112.43	1.36E+004
6	396.17	99.11	1.69E+004	598.86	1.05E+004
7	413.46	103.44	1.01E+004	416.41	9.27E+003
8	445.56	111.46	2.49E+003	125.55	8.06E+003
9	459.01	114.82	1.56E+003	134.55	7.62E+003
10	477.18	119.36	3.01E+003	98.11	7.05E+003
11	493.19	123.36	6.80E+002	126.71	6.52E+003
12	502.30	125.64	3.32E+003	81.60	6.26E+003
13	518.47	129.68	7.89E+003	105.57	5.70E+003
14	577.43	144.42	2.40E+002	59.19	4.20E+003
15	595.39	148.90	9.86E+002	65.05	3.92E+003
16	659.77	164.99	2.76E+002	50.43	2.99E+003
17	833.19	208.33	4.23E+003	147.42	1.50E+003
18	1201.00	300.26	7.04E+002	36.03	6.51E+002
19	1248.34	312.09	4.21E+003	72.72	5.71E+002
20	1331.68	332.92	9.30E+002	38.63	5.02E+002
21	1342.90	335.72	4.84E+002	32.29	4.92E+002
22	1363.83	340.95	5.11E+002	57.03	4.55E+002
23	1379.85	344.95	7.29E+002	70.57	4.30E+002
24	1473.91	368.46	2.62E+002	27.98	3.51E+002
25	1501.09	375.26	2.22E+003	53.25	3.30E+002
26	1521.23	380.29	3.22E+002	59.80	3.10E+002
27	1534.59	383.63	1.64E+002	48.77	2.87E+002
28	1572.31	393.05	7.20E+002	33.93	2.63E+002
29	1655.53	413.85	2.03E+003	47.94	2.14E+002
30	1663.14	415.76	1.51E+002	21.03	2.12E+002
31	1691.12	422.75	1.47E+002	18.24	1.83E+002
32	1806.53	451.59	2.66E+002	20.32	1.42E+002
33	2044.09	510.96	1.00E+002	15.14	8.99E+001

34	2332.76	583.10	8.33E+001	12.50	7.43E+001
35	2437.85	609.37	8.34E+001	12.62	7.12E+001
36	2648.91	662.12	3.58E+002	21.04	6.29E+001
37	2888.22	721.93	1.14E+002	13.53	4.02E+001
38	3645.74	911.24	7.05E+001	10.54	2.74E+001
39	5846.82	1461.33	5.95E+002	25.04	5.66E+000
40	7063.18	1765.33	3.61E+001	7.14	3.35E+000

N U C L I D E   I D E N T I F I C A T I O N   R E P O R T

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.991	661.65*	85.12	1.56260E-003	1.04214E-004
NP-237	0.999	300.17*	6.20	3.26041E-002	2.29297E-003
		312.00*	36.00	3.39203E-002	1.72438E-003
		340.60*	4.20	3.62582E-002	4.38211E-003
		375.00*	0.68	1.00748E+000	5.05435E-002
		415.60*	1.75	2.76177E-002	4.00423E-003
Pu-239	0.995	129.28*	0.01	4.58967E+002	7.73077E+001
		375.00*	0.00	4.32962E+002	3.49614E+001
		413.70*	0.00	4.27195E+002	3.48479E+001
		451.50* @	0.00	4.60533E+002	3.95901E+001
AM-241	0.996	59.54*	35.70	4.74788E+002	4.06801E+001
		125.28*	0.00	3.12434E+002	1.69764E+001
		335.40*	0.00	2.90061E+002	2.36074E+001
		662.42* @	0.00	3.69468E+002	2.46206E+001
PU-241	0.976	722.70*	0.00	3.36145E+002	4.10487E+001
		114.00*	0.02	2.93086E+001	2.99245E+000
		332.60*	0.00	9.51937E+001	5.95391E+000

I N T E R F E R E N C E   C O R R E C T E D   R E P O R T

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg )	Wt mean Activity Uncertainty
CS-137	0.991	1.940700E-004	1.166653E-004
NP-237	0.999	3.308436E-002	1.248818E-003
Pu-239 @	0.995	4.342273E+002	1.235623E+001
AM-241 @	0.996	3.235815E+002	1.243996E+001
PU-241	0.976	4.259547E+001	2.673742E+000

? = nuclide is part of an undetermined solution  
X = nuclide rejected by the interference analysis  
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

\*\*\*\*\*  
 \*\*\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

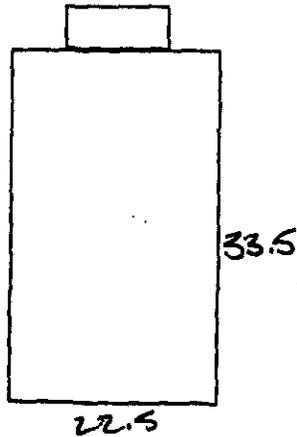
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg )	Nuclide MDA (uCi/kg )	Activity (uCi/kg )
	CO-60	1173.22	100.00	2.4149E-004	1.66E-004	4.2939E-005
		1332.49	100.00	1.6579E-004		1.2486E-004
	CS-134	475.35	1.46	2.0845E-002	2.70E-004	1.4124E-003
		563.23	8.38	3.2195E-003		-8.2060E-004
		569.32	15.43	1.7135E-003		-2.0591E-003
		604.70	97.60	3.1567E-004		8.6857E-005
		795.84	85.40	2.7048E-004		5.1856E-005
		801.93	8.73	2.6347E-003		-1.0565E-003
		1038.57	1.00	2.1707E-002		1.7031E-003
		1167.94	1.80	1.3446E-002		-4.6134E-003
		1365.15	3.04	5.5037E-003		1.4684E-004
+	CS-137	661.65*	85.12	1.7296E-004	1.73E-004	1.5626E-003
+	NP-237	300.17*	6.20	5.6236E-003	9.18E-004	3.2604E-002
		312.00*	36.00	9.1844E-004		3.3920E-002
		340.60*	4.20	7.2391E-003		3.6258E-002
		375.00*	0.68	3.9531E-002		1.0075E+000
		415.60*	1.75	1.2868E-002		2.7618E-002
+	Pu-239	129.28*	0.01	2.0596E+001	1.49E+001	4.5897E+002
		375.00*	0.00	1.6988E+001		4.3296E+002
		413.70*	0.00	1.4918E+001		4.2720E+002
		451.50*	0.00	1.0100E+002		4.6053E+002
+	AM-241	59.54*	35.70	1.7359E-001	1.74E-001	4.7479E+002
		125.28*	0.00	3.4901E+001		3.1243E+002
		335.40*	0.00	6.3464E+001		2.9006E+002
		662.42*	0.00	4.0897E+001		3.6947E+002
		722.70*	0.00	9.4518E+001		3.3614E+002
+	PU-241	114.00*	0.02	7.6897E+000	7.69E+000	2.9309E+001
		332.60*	0.00	1.0938E+001		9.5194E+001
	CM-243	209.70	3.27	3.5513E-002	4.23E-003	2.0537E-001
		228.18	10.56	6.5010E-003		-4.8785E-003
		277.60	14.00	4.2255E-003		-3.5006E-003

+ = Nuclide identified during the nuclide identification  
 \* = Energy line found in the spectrum  
 > = MDA value not calculated  
 @ = Half-life too short to be able to perform the decay correction

N U C L I D E T O T A L S

Nuclide	Mass (g)
Pu-239	7.80E-001 +/- 2.22E-002

**Bldg 233-S**  
**NDA Item Description Sheet**  
**Bottle or Cylinder Geometry**



Put Dimensions on Bottle

Item ID: 2335-D-0116

.8267  
.7059

Weight (kg): 180kg 397lbs 154.09kg NET

Material Description: Packaging

Packaging: Drum

Detector Distance (in): 24

Detector Filters: N/A

Dose Rate: < 5

Comments: 18<sup>u</sup> 1398 - 180054

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0116  
 File Name: 1398

Assay Date: 3-Apr-02  
 File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	6.62E+02	5.32E+01
Am-241	3.39E+02	3.87E+01
Np-237	8.89E-03	5.40E-04
U-238		
U-235		
Cs-137	6.23E-04	1.82E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5  
 Weight (lbs): 339

Width (in): 22.5  
 Depth for TMU (in): 4

Depth (in): 22.5  
 % Volume: 50

Am-241 Calcs:

Measured	3.39E+02	+/-	3.39E+03	Calc from Pu-239
Calculated	9.16E+02	+/-	1.86E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	2.68E+02	+/-	2.17E+02
Pu-239	6.62E+02	+/-	5.37E+02
Pu-240	3.45E+02	+/-	2.80E+02
Pu-241	1.29E+03	+/-	1.04E+03
Pu-242	3.48E-01	+/-	2.82E-01
Am-241	9.16E+02	+/-	1.86E+03
Np-237	8.89E-03	+/-	7.19E-03
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	6.23E-04	+/-	5.34E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

<b>Total TRU Activity(nCi/g):</b>	2.19E+03	+/-	1.97E+03	Calc from Pu-239 Act
<b>Pu (g):</b>	1.90E+00	<b>Pu (g) + 3 sigma TMU:</b>	6.52E+00	
		<b>Pu(g) + 3 sigma:</b>	2.36E+00	

Comments:

Am-241 from 722 keV was 4/1/02

Errors:

Analyst:

Martin Winterrose

Date: 4/3/02

#Date & Time: Wed Apr 03 08:25:00 2002  
~g=SIMPLE\_CYLINDER  
~description=233S-01-0116  
~comment=DRUM\_WITH\_SAMPLES  
~Ccollimator=50MM-180D  
~crpn=4  
~Detector=7219  
~Convergence in %=1 ~MDRPN=4  
~Lunit=IN ~Tunit=C ~Dunit=G/CU.C ~Punit=MM.HG  
~at=20 ~ap=760 ~rh=50  
~Energies kev= 50.000, 100.000, 128.000, 130.000, 150.000, 200.000,#  
300.000, 500.000, 700.000, 1000.000, 1400.000, 2000.000,#  
4000.000,  
~Error in %= 10.000, 10.000, 10.000, 10.000, 10.000, 8.000,#  
8.000, 6.000, 6.000, 4.000, 4.000, 4.000,#  
4.000,  
~d1.1=0.0416 ~d1.2=22.5 ~d1.3=33.5 ~lmater=CSTEEL ~lden=7.86  
~d3.1=33 ~3mater=SAMPLEHS ~3den=0.8267 ~3con=1  
~sdl=24

C A N B E R R A I S O C S A N A L Y S I S

Report Generated On : 4/03/02 8:57:45 AM

Sample Title : 233s-01-0116

Spectrum Description :

Sample Identification : 1398

Sample Size : 154.1 kg

Sample Taken On : 4/03/02 8:26:00 AM

Acquisition Started : 4/03/02 8:27:15 AM

Live Time: 1800.0 seconds Real Time: 1820.9 seconds

ISOCs Calibration : 233S-01-0116

Energy Calibration Used Done On : 2/27/01

Efficiency Calibration Used Done On : 4/03/02

P E A K A N A L Y S I S R E P O R T

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.19	59.88	4.57E+005	15517.4	8.10E+003
2	291.96	73.07	2.02E+003	113.59	5.74E+003
3	301.06	75.35	3.81E+003	137.69	5.87E+003
4	340.05	85.09	1.70E+003	117.86	6.25E+003
5	350.23	87.63	5.14E+002	89.24	6.30E+003
6	395.93	99.06	9.16E+003	330.40	6.33E+003
7	413.76	103.51	5.15E+003	254.75	6.24E+003
8	445.21	111.37	1.96E+003	117.87	6.40E+003
9	460.62	115.22	1.28E+003	174.47	6.23E+003
10	494.57	123.71	5.01E+002	89.93	5.76E+003
11	502.46	125.68	2.03E+003	98.76	5.64E+003
12	518.49	129.69	9.40E+003	122.77	5.41E+003
13	576.67	144.22	3.04E+002	69.26	4.55E+003
14	585.78	146.50	3.28E+002	81.82	4.46E+003
15	595.62	148.96	8.35E+002	65.77	4.32E+003
16	645.22	161.36	3.32E+002	55.49	3.65E+003
17	815.35	203.88	1.42E+003	56.23	2.00E+003
18	833.17	208.33	3.92E+003	75.64	1.83E+003
19	1201.19	300.31	1.50E+002	31.83	8.64E+002
20	1248.28	312.07	1.22E+003	45.77	8.15E+002
21	1331.90	332.97	1.49E+003	47.39	7.31E+002
22	1343.10	335.77	6.73E+002	38.27	7.09E+002
23	1380.82	345.20	1.22E+003	46.21	6.35E+002
24	1472.42	368.09	3.77E+002	53.52	4.63E+002
25	1500.99	375.23	3.80E+003	78.12	4.19E+002
26	1521.22	380.29	5.92E+002	94.19	3.75E+002
27	1533.45	383.34	3.95E+002	79.43	3.63E+002
28	1572.42	393.08	1.29E+003	42.12	3.08E+002
29	1655.53	413.85	3.53E+003	66.59	2.53E+002
30	1690.89	422.69	2.39E+002	22.54	2.01E+002
31	1806.81	451.66	4.35E+002	24.36	1.53E+002
32	2044.62	511.09	1.47E+002	16.29	1.12E+002
33	2332.92	583.15	1.00E+001	13.64	7.32E+001

34	2437.66	609.32	1.57E+002	15.64	7.82E+001
35	2646.94	661.63	1.63E+002	47.21	6.52E+001
36	2650.07	662.41	2.38E+002	47.81	6.37E+001
37	2888.15	721.91	1.32E+002	14.53	5.83E+001
38	3645.34	911.14	6.53E+001	10.59	4.11E+001
39	5846.39	1461.23	5.67E+002	24.60	5.31E+000
40	7064.84	1765.74	6.12E+001	8.81	2.88E+000

N U C L I D E   I D E N T I F I C A T I O N   R E P O R T

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Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	6.23358E-004	1.81702E-004
NP-237	0.859	300.17*	6.20	6.25624E-003	1.36347E-003
		312.00*	36.00	8.88989E-003	5.39536E-004
		340.60	4.20		
		375.00*	0.68	1.54198E+000	7.50027E-002
		415.60*	1.75	5.73618E-001	2.60752E-002
Pu-239	0.995	129.28*	0.01	5.06966E+002	8.53794E+001
		375.00*	0.00	6.62661E+002	5.28864E+001
		413.70*	0.00	6.62890E+002	5.32454E+001
		451.50* @	0.00	6.70766E+002	4.58516E+001
AM-241	0.995	59.54*	35.70	6.92106E+001	5.98116E+000
		125.28*	0.00	1.77554E+002	1.21798E+001
		335.40*	0.00	3.62612E+002	2.66593E+001
		662.42* @	0.00	2.15128E+002	4.37954E+001
		722.70*	0.00	3.38890E+002	3.87064E+001
PU-241	0.948	114.00*	0.02	2.23036E+001	3.26725E+000
		332.60*	0.00	1.37344E+002	7.76319E+000

I N T E R F E R E N C E   C O R R E C T E D   R E P O R T

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Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg )	Wt mean Activity Uncertainty
CS-137	1.000	6.233577E-004	1.817016E-004
NP-237	0.859	8.560905E-003	5.016294E-004
Pu-239	@ 0.995	5.895341E+002	1.639315E+001
AM-241	@ 0.995	1.051970E+002	5.215090E+000
PU-241	0.948	3.961413E+001	3.011413E+000

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

\*\*\*\*\*  
 \*\*\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

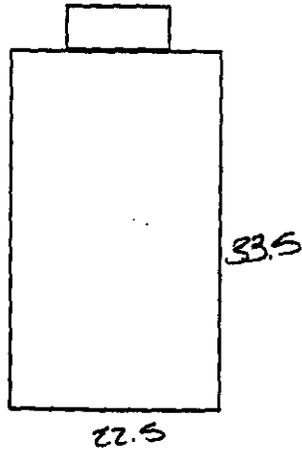
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg )	Nuclide MDA (uCi/kg )	Activity (uCi/kg )
	CO-60	1173.22	100.00	1.9404E-004	1.52E-004	-7.8786E-005
		1332.49	100.00	1.5208E-004		-6.8237E-005
	CS-134	475.35	1.46	1.8302E-002	2.35E-004	-1.5067E-002
		563.23	8.38	3.0855E-003		6.2117E-004
		569.32	15.43	1.6449E-003		1.2614E-003
		604.70	97.60	3.0906E-004		-2.2364E-004
		795.84	85.40	2.3525E-004		1.7223E-004
		801.93	8.73	2.1402E-003		-8.6042E-004
		1038.57	1.00	1.9542E-002		1.8376E-002
		1167.94	1.80	1.0575E-002		-5.1444E-003
		1365.15	3.04	4.6278E-003		2.4270E-003
+	CS-137	661.65*	85.12	1.5412E-004	1.54E-004	6.2336E-004
+	NP-237	300.17*	6.20	5.8250E-003	9.84E-004	6.2562E-003
		312.00*	36.00	9.8409E-004		8.8899E-003
		340.60	4.20	1.7700E-002		9.0372E-003
		375.00*	0.68	3.9751E-002		1.5420E+000
		415.60*	1.75	1.2476E-002		5.7362E-001
+	Pu-239	129.28*	0.01	1.8601E+001	1.44E+001	5.0697E+002
		375.00*	0.00	1.7083E+001		6.6266E+002
		413.70*	0.00	1.4418E+001		6.6289E+002
		451.50*	0.00	9.2846E+001		6.7077E+002
+	AM-241	59.54*	35.70	6.3867E-002	6.39E-002	6.9211E+001
		125.28*	0.00	3.0755E+001		1.7755E+002
		335.40*	0.00	6.8211E+001		3.6261E+002
		662.42*	0.00	3.6057E+001		2.1513E+002
		722.70*	0.00	9.8086E+001		3.3889E+002
+	PU-241	114.00*	0.02	6.4336E+000	6.43E+000	2.2304E+001
		332.60*	0.00	1.1819E+001		1.3734E+002
	CM-243	209.70	3.27	3.2998E-002	4.31E-003	2.4444E-001
		228.18	10.56	6.7697E-003		3.6453E-004
		277.60	14.00	4.3126E-003		-4.5015E-003

+ = Nuclide identified during the nuclide identification  
 \* = Energy line found in the spectrum  
 > = MDA value not calculated  
 @ = Half-life too short to be able to perform the decay correction

N U C L I D E T O T A L S

Nuclide	Mass (g)
Pu-239	1.47E+000 +/- 4.07E-002

**Bldg 233-S**  
**NDA Item Description Sheet**  
**Bottle or Cylinder Geometry**



Put Dimensions on Bottle

Item ID: 2335-01-0125

6413

Weight (kg): 366 300<sup>LBS</sup> 140kg

Material Description: PACKAGED

Packaging: DOWN

Detector Distance (in): 24

Detector Filters: NONE

Dose Rate: 100/20

Comments: 1800 1383

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0125  
 File Name: 1383

Assay Date: 21-Mar-02  
 File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	4.83E+01	5.21E+00
Am-241	2.49E+01	2.15E+00
Np-237	2.07E-02	1.06E-03
U-238		
U-235		
Cs-137	9.30E-04	7.04E-05
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5  
 Weight (lbs): 308

Width (in): 22.5  
 Depth for TMU (in): 4

Depth (in): 22.5  
 % Volume: 50

Am-241 Calcs:

Measured	2.49E+01	+/-	2.49E+02	Calc from Pu-239
Calculated	6.68E+01	+/-	1.36E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.96E+01	+/-	1.59E+01
Pu-239	4.83E+01	+/-	3.93E+01
Pu-240	2.52E+01	+/-	2.05E+01
Pu-241	9.40E+01	+/-	7.65E+01
Pu-242	2.54E-02	+/-	2.07E-02
Am-241	6.68E+01	+/-	1.36E+02
Np-237	2.07E-02	+/-	1.67E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	9.30E-04	+/-	7.53E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

<b>Total TRU Activity(nCi/g):</b>	1.60E+02	+/-	1.44E+02	Calc from Pu-239 Act
<b>Pu (g):</b>	1.26E-01	<b>Pu (g) + 3 sigma TMU:</b>	4.33E-01	
		<b>Pu(g) + 3 sigma:</b>	1.67E-01	

Comments:

Errors:

Analyst:

Martin Winterrose

Date:

3/21/02

#Date & Time: Thu Mar 21 11:39:21 2002  
~g=SIMPLE\_CYLINDER  
~description=233S-01-0125  
~comment=DRUM\_WITH\_SAMPLES  
~Collimator=50MM-180D  
~crpn=4  
~Detector=7219  
~Convergence in %=1 ~MDRPN=4  
~Lunit=IN ~Tunit=C ~Dunit=G/CU.C ~Punit=MM.HG  
~at=20 ~ap=760 ~rh=50  
~Energies kev= 50.000, 100.000, 128.000, 130.000, 150.000, 200.000,#  
300.000, 500.000, 700.000, 1000.000, 1400.000, 2000.000,#  
4000.000,  
~Error in %= 10.000, 10.000, 10.000, 10.000, 10.000, 8.000,#  
8.000, 6.000, 6.000, 4.000, 4.000, 4.000,#  
4.000,  
~d1.1=0.0416 ~d1.2=22.5 ~d1.3=33.5 ~1mater=CSTEEL ~1den=7.86  
~d3.1=33 ~3mater=SAMPLEHS ~3den=0.6413 ~3con=1  
~sdl=24

C A N B E R R A I S O C S A N A L Y S I S

Report Generated On : 3/21/02 11:42:02 AM

Sample Title : 233s-01-0125  
 Spectrum Description :  
 Sample Identification : 1383  
 Sample Size : 140.0 kg

Sample Taken On : 3/21/02 11:03:00 AM  
 Acquisition Started : 3/21/02 11:40:51 AM

Live Time: 1800.0 seconds Real Time: 1809.5 seconds

ISOCS Calabration : 233S-01-0125  
 Energy Calibration Used Done On : 2/27/01  
 Efficiency Calibration Used Done On : 3/21/02

P E A K A N A L Y S I S R E P O R T

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.19	59.88	1.93E+005	6531.82	4.01E+003
2	340.26	85.14	7.23E+002	67.71	3.61E+003
3	395.89	99.04	2.03E+003	104.92	3.71E+003
4	413.23	103.38	8.78E+002	67.44	3.67E+003
5	444.95	111.31	3.70E+002	63.06	3.82E+003
6	458.63	114.73	2.67E+002	65.17	3.75E+003
7	502.13	125.60	2.59E+002	61.57	3.43E+003
8	518.21	129.62	9.47E+002	63.79	3.30E+003
9	833.29	208.36	4.72E+002	34.08	7.85E+002
10	1201.17	300.30	5.38E+002	29.76	3.65E+002
11	1248.39	312.10	3.19E+003	59.86	3.14E+002
12	1332.32	333.08	1.01E+002	18.50	2.58E+002
13	1362.79	340.69	2.66E+002	27.40	2.49E+002
14	1501.21	375.29	4.01E+002	24.14	1.79E+002
15	1572.57	393.12	1.11E+002	15.98	1.55E+002
16	1593.71	398.40	1.14E+002	15.96	1.45E+002
17	1655.73	413.90	2.85E+002	21.23	1.27E+002
18	1663.35	415.81	1.22E+002	16.77	1.25E+002
19	2044.58	511.08	1.05E+002	14.19	7.81E+001
20	2332.62	583.07	8.66E+001	12.63	7.19E+001
21	2437.25	609.22	1.36E+002	14.48	6.65E+001
22	2647.40	661.74	2.65E+002	18.24	4.63E+001
23	3645.28	911.13	6.03E+001	9.75	2.64E+001
24	3877.27	969.11	4.74E+001	9.62	2.44E+001
25	5846.53	1461.26	5.47E+002	24.02	7.30E+000
26	7063.49	1765.40	4.52E+001	7.81	2.67E+000

N U C L I D E I D E N T I F I C A T I O N R E P O R T

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	9.30015E-004	7.04041E-005
NP-237	1.000	300.17*	6.20	2.00566E-002	1.47255E-003
		312.00*	36.00	2.07138E-002	1.06379E-003
		340.60*	4.20	1.52050E-002	1.71674E-003
		415.76*	1.75	1.78576E-002	2.57198E-003
Pu-239	0.956	129.28*	0.01	4.44786E+001	8.04763E+000
		413.70*	0.00	4.82961E+001	5.21327E+000
		451.50 @	0.00		
AM-241	0.995	59.54*	35.70	2.49270E+001	2.15376E+000
		125.28*	0.00	1.96704E+001	4.77633E+000
		335.40	0.00		
		662.42* @	0.00	2.19897E+002	1.66360E+001
PU-241	0.980	722.70	0.00		
		114.00*	0.02	4.06572E+000	1.01576E+000
		332.60*	0.00	8.30420E+000	1.57325E+000

I N T E R F E R E N C E C O R R E C T E D R E P O R T

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg )	Wt mean Activity Uncertainty
CS-137	1.000	8.283472E-004	7.084754E-005
NP-237	1.000	1.929497E-002	7.381494E-004
Pu-239	@ 0.956	4.716764E+001	4.375421E+000
AM-241	@ 0.995	2.403873E+001	1.963382E+000
PU-241	0.980	5.312737E+000	8.533517E-001

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

N U C L I D E T O T A L S

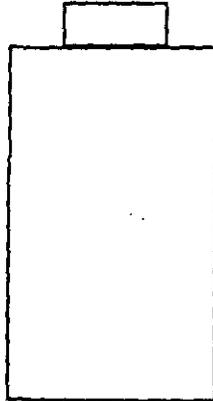
Nuclide	Mass (g)
Pu-239	1.07E-001 +/- 9.88E-003

\*\*\*\*\*  
 \*\*\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
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Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg )	Nuclide MDA (uCi/kg )	Activity (uCi/kg )
CO-60	1173.22	100.00	1.7815E-004	1.41E-004	-1.1099E-004
	1332.49	100.00	1.4130E-004		-1.4536E-004
CS-134	475.35	1.46	1.4784E-002	2.04E-004	-1.8998E-002
	563.23	8.38	2.3266E-003		-1.5723E-004
	569.32	15.43	1.2829E-003		6.5846E-004
	604.70	97.60	2.5995E-004		1.2264E-005
	795.84	85.40	2.0403E-004		-2.5300E-004
	801.93	8.73	2.0450E-003		-1.1262E-003
	1038.57	1.00	1.8032E-002		1.7981E-002
	1167.94	1.80	1.0240E-002		-7.5723E-003
	1365.15	3.04	4.6914E-003		1.2835E-003
+ CS-137	661.65*	85.12	1.2066E-004	1.21E-004	9.3001E-004
+ NP-237	300.17*	6.20	3.4159E-003	5.52E-004	2.0057E-002
	312.00*	36.00	5.5250E-004		2.0714E-002
	340.60*	4.20	4.3508E-003		1.5205E-002
	415.76*	1.75	8.0376E-003		1.7858E-002
+ Pu-239	129.28*	0.01	1.2692E+001	9.37E+000	4.4479E+001
	413.70*	0.00	9.3673E+000		4.8296E+001
	451.50	0.00	1.2243E+002		1.3692E+002
+ AM-241	59.54*	35.70	3.8521E-002	3.85E-002	2.4927E+001
	125.28*	0.00	2.0928E+001		1.9670E+001
	335.40	0.00	7.1482E+001		5.6978E+001
	662.42*	0.00	2.8530E+001		2.1990E+002
	722.70	0.00	1.5900E+002		2.0090E+002
+ PU-241	114.00*	0.02	4.3725E+000	4.37E+000	4.0657E+000
	332.60*	0.00	6.3784E+000		8.3042E+000
CM-243	209.70	3.27	1.5991E-002	2.64E-003	1.2285E-002
	228.18	10.56	3.9912E-003		-1.3095E-003
	277.60	14.00	2.6447E-003		-3.8742E-004

+ = Nuclide identified during the nuclide identification  
 \* = Energy line found in the spectrum  
 > = MDA value not calculated  
 @ = Half-life too short to be able to perform the decay correction

**Bldg 233-S**  
**NDA Item Description Sheet**  
**Bottle or Cylinder Geometry**



Put Dimensions on Bottle

Item ID: 2335-01-0127

4265

Weight (kg): 135 298LBS 109 NICKEL

240

Material Description: PACKAGES

Packaging: DRUM

Detector Distance (in): 24

Detector Filters: None

Dose Rate: 6.5

Comments: 13909-1800

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: **233s-01-0127**  
 File Name: **1399**

Assay Date: **3-Apr-02**  
 File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	5.39E+02	4.36E+01
Am-241	3.01E+02	4.01E+01
Np-237	2.07E-02	1.09E-03
U-238		
U-235		
Cs-137	9.14E-04	2.15E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: **Internal**

Item Type: **Barrel**

Calcs: **Use 1st**

Dimensions:

Length (in): **33.5**  
 Weight (lbs): **240**

Width (in): **22.5**  
 Depth for TMU (in): **4**

Depth (in): **22.5**  
 % Volume: **50**

Am-241 Calcs:

Measured	3.01E+02	+/-	9.12E+02	Calc from Pu-239
Calculated	7.46E+02	+/-	8.08E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	2.18E+02	+/-	9.19E+01
Pu-239	5.39E+02	+/-	2.27E+02
Pu-240	2.81E+02	+/-	1.18E+02
Pu-241	1.05E+03	+/-	4.42E+02
Pu-242	2.84E-01	+/-	1.19E-01
Am-241	7.46E+02	+/-	8.08E+02
Np-237	2.07E-02	+/-	8.60E-03
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	9.14E-04	+/-	4.34E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

<b>Total TRU Activity(nCi/g):</b>	1.78E+03	+/-	8.52E+02	Calc from Pu-239 Act
<b>Pu (g):</b>	1.09E+00	<b>Pu (g) + 3 sigma TMU:</b>	2.48E+00	
		<b>Pu(g) + 3 sigma:</b>	1.36E+00	

Comments:

Am-241 from 722 keV peak. Errors:

Analyst:

Martin Winterrose

Date:

4/3/02

#Date & Time: Wed Apr 03 09:25:14 2002  
~g=SIMPLE\_CYLINDER  
~description=233S-01-0127  
~comment=DRUM\_WITH\_SAMPLES  
~Ccollimator=50MM-180D  
~crpn=4  
~Detector=7219  
~Convergence in %=1 ~MDRPN=4  
~Lunit=IN ~Tunit=C ~Dunit=G/CU.C ~Punit=MM.HG  
~at=20 ~ap=760 ~rh=50  
~Energies kev= 50.000, 100.000, 128.000, 130.000, 150.000, 200.000, #  
300.000, 500.000, 700.000, 1000.000, 1400.000, 2000.000, #  
4000.000,  
~Error in %= 10.000, 10.000, 10.000, 10.000, 10.000, 8.000, #  
8.000, 6.000, 6.000, 4.000, 4.000, 4.000, #  
4.000,  
~d1.1=0.0416 ~d1.2=22.5 ~d1.3=33.5 ~lmater=CSTEEL ~lden=7.86  
~d3.1=33 ~3mater=SAMPLEHS ~3den=0.6205 ~3con=1  
~sdl=24

C A N B E R R A I S O C S A N A L Y S I S

Report Generated On : 4/03/02 9:58:07 AM

Sample Title : 233s-01-0127

Spectrum Description :

Sample Identification : 1399

Sample Size : 109.1 kg

Sample Taken On : 4/03/02 9:27:00 AM

Acquisition Started : 4/03/02 9:27:27 AM

Live Time: 1800.0 seconds Real Time: 1831.7 seconds

ISOCS Calabration : 233S-01-0127

Energy Calibration Used Done On : 2/27/01

Efficiency Calibration Used Done On : 4/03/02

P E A K A N A L Y S I S R E P O R T

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.16	59.88	7.71E+005	28568.1	1.17E+004
2	291.88	73.05	1.98E+003	98.47	6.50E+003
3	301.00	75.33	3.66E+003	113.88	6.57E+003
4	340.22	85.13	1.63E+003	112.37	6.68E+003
5	349.45	87.44	3.70E+002	85.40	6.66E+003
6	396.10	99.10	9.84E+003	342.06	6.40E+003
7	413.64	103.48	5.54E+003	267.19	6.25E+003
8	445.62	111.47	2.07E+003	143.98	6.29E+003
9	459.29	114.89	1.13E+003	163.65	6.10E+003
10	494.46	123.68	5.08E+002	73.85	5.55E+003
11	502.35	125.65	2.29E+003	87.37	5.41E+003
12	518.51	129.69	7.97E+003	114.14	5.11E+003
13	576.24	144.12	2.86E+002	84.87	4.20E+003
14	587.13	146.84	3.66E+002	94.75	4.06E+003
15	595.82	149.01	7.77E+002	63.04	3.94E+003
16	815.17	203.83	1.05E+003	50.06	1.74E+003
17	833.13	208.32	3.66E+003	71.69	1.60E+003
18	1201.45	300.37	4.93E+002	33.30	6.86E+002
19	1248.38	312.10	2.55E+003	56.65	6.25E+002
20	1331.75	332.93	1.14E+003	41.57	5.57E+002
21	1342.97	335.74	5.12E+002	33.06	5.43E+002
22	1365.01	341.25	3.08E+002	46.51	5.07E+002
23	1380.45	345.10	1.02E+003	58.40	4.89E+002
24	1474.12	368.51	3.03E+002	27.79	3.63E+002
25	1501.02	375.24	2.82E+003	57.33	3.32E+002
26	1521.38	380.33	4.63E+002	70.42	3.09E+002
27	1533.86	383.44	2.55E+002	58.46	2.91E+002
28	1572.37	393.07	8.89E+002	33.95	2.66E+002
29	1655.66	413.88	2.54E+003	53.20	2.13E+002
30	1690.82	422.67	1.41E+002	18.04	1.68E+002
31	1806.33	451.54	3.11E+002	21.46	1.30E+002
32	2045.16	511.23	1.11E+002	17.05	1.18E+002
33	2437.34	609.24	1.00E+002	15.27 <sup>81</sup>	7.65E+001

34	2647.32	661.72	2.07E+002	48.39	6.27E+001
35	2649.99	662.39	1.90E+002	47.04	6.13E+001
36	2887.88	721.84	1.02E+002	13.16	5.39E+001
37	3645.98	911.30	8.83E+001	11.50	3.61E+001
38	4482.63	1120.40	6.91E+001	10.15	2.28E+001
39	5846.51	1461.26	5.50E+002	24.16	8.81E+000
40	7063.67	1765.45	5.51E+001	8.42	1.75E+000

N U C L I D E   I D E N T I F I C A T I O N   R E P O R T

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	9.13862E-004	2.15194E-004
NP-237	0.994	300.17*	6.20	2.30072E-002	1.90935E-003
		312.00*	36.00	2.07054E-002	1.09161E-003
		340.60*	4.20	2.20505E-002	3.48146E-003
		375.00*	0.68	1.28666E+000	6.24743E-002
		415.60*	1.75	4.66420E-001	2.16230E-002
Pu-239	0.995	129.28*	0.01	4.66062E+002	7.85382E+001
		375.00*	0.00	5.52939E+002	4.41009E+001
		413.70*	0.00	5.39009E+002	4.35719E+001
		451.50* @	0.00	5.43099E+002	4.31379E+001
AM-241	0.996	59.54*	35.70	1.24184E+002	1.08874E+001
		125.28*	0.00	2.17134E+002	1.33797E+001
		335.40*	0.00	3.09140E+002	2.46267E+001
		662.42* @	0.00	1.98466E+002	4.94348E+001
		722.70*	0.00	3.01152E+002	4.01014E+001
PU-241	0.972	114.00*	0.02	2.13129E+001	3.30168E+000
		332.60*	0.00	1.17474E+002	6.96921E+000

I N T E R F E R E N C E   C O R R E C T E D   R E P O R T

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg )	Wt mean Activity Uncertainty
CS-137	1.000	9.138624E-004	2.151938E-004
NP-237	0.994	2.136255E-002	9.139460E-004
Pu-239 @	0.995	5.036823E+002	1.426015E+001
AM-241 @	0.996	1.815235E+002	7.834256E+000
PU-241	0.972	3.893934E+001	2.983773E+000

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

\*\*\*\*\*  
 \*\*\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

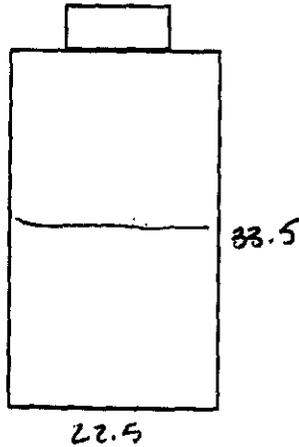
Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg )	Nuclide MDA (uCi/kg )	Activity (uCi/kg )
CO-60	1173.22	100.00	2.3258E-004	1.87E-004	4.9015E-005
	1332.49	100.00	1.8667E-004		-2.5399E-005
CS-134	475.35	1.46	2.1219E-002	2.66E-004	-6.9467E-003
	563.23	8.38	3.2547E-003		1.4966E-003
	569.32	15.43	1.8570E-003		2.0573E-003
	604.70	97.60	3.4036E-004		-1.2959E-004
	795.84	85.40	2.6585E-004		-7.1549E-005
	801.93	8.73	2.6251E-003		-1.8646E-003
	1038.57	1.00	2.1643E-002		-1.2136E-003
	1167.94	1.80	1.3332E-002		1.0158E-002
	1365.15	3.04	6.6396E-003		4.2961E-003
	+ CS-137	661.65*	85.12		1.7426E-004
+ NP-237	300.17*	6.20	5.8125E-003	9.67E-004	2.3007E-002
	312.00*	36.00	9.6658E-004		2.0705E-002
	340.60*	4.20	7.6884E-003		2.2051E-002
	375.00*	0.68	3.9930E-002		1.2867E+000
	415.60*	1.75	1.2968E-002		4.6642E-001
+ Pu-239	129.28*	0.01	1.9619E+001	1.50E+001	4.6606E+002
	375.00*	0.00	1.7160E+001		5.5294E+002
	413.70*	0.00	1.4986E+001		5.3901E+002
+ AM-241	451.50*	0.00	9.7641E+001	8.16E-002	5.4310E+002
	59.54*	35.70	8.1591E-002		1.2418E+002
	125.28*	0.00	3.2652E+001		2.1713E+002
	335.40*	0.00	6.7129E+001		3.0914E+002
	662.42*	0.00	4.0803E+001		1.9847E+002
+ PU-241	722.70*	0.00	1.0936E+002	6.92E+000	3.0115E+002
	114.00*	0.02	6.9154E+000		2.1313E+001
	332.60*	0.00	1.1606E+001		1.1747E+002
CM-243	209.70	3.27	3.4342E-002	4.40E-003	2.9966E-001
	228.18	10.56	6.7168E-003		-9.1304E-004
	277.60	14.00	4.3976E-003		-4.5854E-003

+ = Nuclide identified during the nuclide identification  
 \* = Energy line found in the spectrum  
 > = MDA value not calculated  
 @ = Half-life too short to be able to perform the decay correction

N U C L I D E T O T A L S

Nuclide	Mass (g)
Pu-239	8.86E-001 +/- 2.51E-002

**Bldg 233-S**  
**NDA Item Description Sheet**  
**Bottle or Cylinder Geometry**



Put Dimensions on Bottle

Item ID: 233S-01-0128

Weight (kg): 146 LBS 40 KG NET

Material Description: Packaging

Packaging: Drum

Detector Distance (in): 241"

Detector Filters: None

Dose Rate: 2.5

Comments: 1/2 FULL 1800 1374

HIGH ENERGY ANNUAL

146  
38 = 88 - [10K5]  
1/2 58126  
F 11906

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID:   
 File Name:

Assay Date:   
 File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	8.38E+02	6.88E+01
Am-241	3.18E+02	6.32E+01
Np-237	2.78E-02	1.52E-03
U-238		
U-235		
Cs-137	1.95E-03	1.70E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination:

Item Type:

Calcs:

Dimensions:

Length (in):   
 Weight (lbs):

Width (in):   
 Depth for TMU (in):

Depth (in):   
 % Volume:

Am-241 Calcs:

Measured	3.18E+02	+/-	3.48E+02	Use Meas
Calculated	1.16E+03	+/-	7.69E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	3.40E+02	+/-	8.12E+01
Pu-239	8.38E+02	+/-	2.00E+02
Pu-240	4.37E+02	+/-	1.04E+02
Pu-241	1.63E+03	+/-	3.90E+02
Pu-242	4.41E-01	+/-	1.05E-01
Am-241	3.18E+02	+/-	3.48E+02
Np-237	2.78E-02	+/-	6.40E-03
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	1.95E-03	+/-	4.68E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	1.93E+03	+/-	4.23E+02	Calc from Pu-239 Act
Pu (g):	6.24E-01	Pu (g) + 3 sigma TMU:	1.07E+00	
		Pu(g) + 3 sigma:	7.78E-01	

Comments:

Errors:

Analyst:

Date:

#Date & Time: Tue Mar 19 09:21:54 2002  
~g=SIMPLE\_CYLINDER  
~description=233S-01-0128  
~comment=DRUM WITH SAMPLES  
~Ccollimator=50MM-180D  
~crpn=4  
~Detector=7219  
~Convergence in %=1 ~MDRPN=4  
~Lunit=IN ~Tunit=C ~Dunit=G/CU.C ~Punit=MM.HG  
~at=20 ~ap=760 ~rh=50  
~Energies keV= 50.000, 100.000, 128.000, 130.000, 150.000, 200.000,#  
300.000, 500.000, 700.000, 1000.000, 1400.000, 2000.000,#  
4000.000,  
~Error in %= 10.000, 10.000, 10.000, 10.000, 10.000, 8.000,#  
8.000, 6.000, 6.000, 4.000, 4.000, 4.000,#  
4.000,  
~d1.1=0.0416 ~d1.2=22.5 ~d1.3=33.5 ~1mater=CSTEEL ~1den=7.86  
~d3.1=33 ~3mater=SAMPLEHS ~3den=0.3812 ~3con=1  
~sdl=24

C A N B E R R A I S O C S A N A L Y S I S

Report Generated On : 3/22/02 10:08:35 AM

Sample Title : 233s-01-0128  
 Spectrum Description :  
 Sample Identification : 1376  
 Sample Size : 40.0 kg

Sample Taken On : 3/19/02 9:23:00 AM  
 Acquisition Started : 3/19/02 9:23:49 AM

Live Time: 1800.0 seconds Real Time: 1848.0 seconds

ISOCS Calabration : 233S-01-0128  
 Energy Calibration Used Done On : 2/27/01  
 Efficiency Calibration Used Done On : 3/19/02

P E A K A N A L Y S I S R E P O R T

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.11	59.86	1.16E+006	45191.5	1.94E+004
2	300.94	75.32	3.00E+003	121.88	8.02E+003
3	340.23	85.14	9.65E+002	90.11	7.58E+003
4	395.88	99.04	9.67E+003	374.08	6.64E+003
5	413.63	103.48	4.38E+003	293.67	6.32E+003
6	445.61	111.47	1.80E+003	134.92	6.10E+003
7	459.32	114.90	1.11E+003	153.77	5.80E+003
8	493.56	123.45	2.34E+002	70.32	5.03E+003
9	502.36	125.66	1.36E+003	76.97	4.79E+003
10	518.45	129.68	7.26E+003	107.37	4.36E+003
11	577.23	144.37	2.86E+002	54.17	3.37E+003
12	594.98	148.80	3.22E+002	52.48	3.16E+003
13	815.04	203.80	8.85E+002	43.76	1.18E+003
14	833.20	208.34	1.80E+003	53.07	1.10E+003
15	1201.06	300.27	2.63E+002	26.56	4.89E+002
16	1248.33	312.09	1.76E+003	47.24	4.45E+002
17	1331.92	332.98	8.47E+002	35.58	3.92E+002
18	1343.15	335.78	3.29E+002	27.82	3.85E+002
19	1365.87	341.46	1.77E+002	35.23	3.53E+002
20	1380.47	345.11	7.65E+002	49.46	3.30E+002
21	1473.81	368.44	2.49E+002	26.48	2.71E+002
22	1500.94	375.22	2.26E+003	52.99	2.55E+002
23	1520.87	380.20	4.18E+002	54.36	2.47E+002
24	1533.59	383.38	2.91E+002	42.45	2.28E+002
25	1572.38	393.07	7.41E+002	31.15	2.06E+002
26	1655.55	413.86	1.99E+003	49.94	1.71E+002
27	1690.79	422.66	1.30E+002	18.11	1.50E+002
28	1805.87	451.43	2.53E+002	19.34	1.25E+002
29	2001.61	511.09	1.32E+002	14.83	8.72E+001
30	2331.11	583.44	9.14E+001	12.83	6.90E+001
31	2431.74	609.34	1.36E+002	14.72	7.31E+001
32	2641.01	661.89	2.15E+002	17.45	6.25E+001
33	2881.95	721.86	5.17E+001	10.15	3.85E+001

34	364	.34	911.14	6.95E+001	10.50	3.49E+001
35	584	.07	1461.15	5.65E+002	24.43	8.78E+000
36	706	.32	1765.36	4.30E+001	7.69	1.83E+000

| N U C L I D E I D E N T I F I C A T I O N R E P O R T |

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.998	661.65*	85.12	1.95389E-003	1.69846E-004
NP-237	0.993	300.17*	6.20	2.37317E-002	2.65893E-003
		312.00*	36.00	2.78004E-002	1.52390E-003
		340.60*	4.20	2.48618E-002	5.06742E-003
		375.00*	0.68	2.03135E+000	1.01482E-001
		415.60*	1.75	7.25493E-001	3.51110E-002
Pu-239	0.995	129.28*	0.01	7.60941E+002	1.28262E+002
		375.00*	0.00	8.72967E+002	7.03774E+001
		413.70*	0.00	8.38401E+002	6.87674E+001
		451.50* @	0.00	8.85249E+002	7.60366E+001
AM-241	0.996	59.54*	35.70	3.14025E+002	2.78118E+001
		125.28*	0.00	2.30592E+002	1.71488E+001
		335.40*	0.00	3.87917E+002	3.74922E+001
		662.42* @	0.00	4.61987E+002	4.01398E+001
PU-241	0.971	722.70*	0.00	3.17824E+002	6.31574E+001
		114.00*	0.02	3.70771E+001	5.52457E+000
		332.60*	0.00	1.70642E+002	1.07264E+001

| I N T E R F E R E N C E C O R R E C T E D R E P O R T |

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg )	Wt mean Activity Uncertainty
CS-137	0.998	7.979251E-004	1.788374E-004
NP-237	0.993	2.669541E-002	1.278859E-003
Pu-239	@ 0.995	8.047471E+002	2.323140E+001
AM-241	@ 0.996	2.733226E+002	1.329749E+001
PU-241	0.971	6.507971E+001	4.911417E+000

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

\*\*\*\*\*  
 \*\*\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
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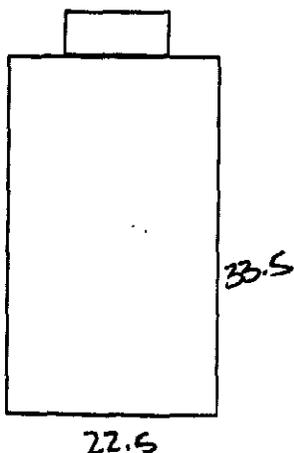
Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg )	Nuclide MDA (uCi/kg )	Activity (uCi/kg )
CO-60	1173.22	100.00	4.9650E-004	4.18E-004	2.8634E-004
	1332.49	100.00	4.1795E-004		-1.5331E-005
CS-134	475.35	1.46	4.0670E-002	5.70E-004	-9.0122E-003
	563.23	8.38	6.5191E-003		2.7219E-003
	569.32	15.43	3.4989E-003		-2.0071E-004
	604.70	97.60	6.9233E-004		-5.1172E-005
	795.84	85.40	5.7039E-004		4.3392E-004
	801.93	8.73	5.5421E-003		-4.6939E-003
	1038.57	1.00	4.6160E-002		1.3770E-002
	1167.94	1.80	2.8467E-002		5.3000E-003
	1365.15	3.04	1.2141E-002		-1.1336E-002
	+ CS-137	661.65*	85.12		3.5831E-004
+ NP-237	300.17*	6.20	9.5427E-003	1.59E-003	2.3732E-002
	312.00*	36.00	1.5923E-003		2.7800E-002
	340.60*	4.20	1.2631E-002		2.4862E-002
	375.00*	0.68	6.9417E-002		2.0314E+000
	415.60*	1.75	2.3226E-002		7.2549E-001
+ Pu-239	129.28*	0.01	3.2507E+001	2.68E+001	7.6094E+002
	375.00*	0.00	2.9832E+001		8.7297E+002
	413.70*	0.00	2.6840E+001		8.3840E+002
	451.50*	0.00	1.9142E+002		8.8525E+002
+ AM-241	59.54*	35.70	1.7664E-001	1.77E-001	3.1403E+002
	125.28*	0.00	5.4887E+001		2.3059E+002
	335.40*	0.00	1.1091E+002		3.8792E+002
	662.42*	0.00	8.4721E+001		4.6199E+002
	722.70*	0.00	1.9410E+002		3.1782E+002
+ PU-241	114.00*	0.02	1.1943E+001	1.19E+001	3.7077E+001
	332.60*	0.00	1.9095E+001		1.7064E+002
CM-243	209.70	3.27	5.0316E-002	7.12E-003	2.2708E-001
	228.18	10.56	1.0874E-002		-6.7319E-003
	277.60	14.00	7.1171E-003		5.8691E-003

+ = Nuclide identified during the nuclide identification  
 \* = Energy line found in the spectrum  
 > = MDA value not calculated  
 @ = Half-life too short to be able to perform the decay correction

N U C L I D E T O T A L S

Nuclide	Mass (g)
Pu-239	5.19E-001 +/- 1.50E-002

**Bldg 233-S**  
**NDA Item Description Sheet**  
**Bottle or Cylinder Geometry**



Put Dimensions on Bottle

Item ID: 2335-01-0129 177051  
370 LBS 167kg 312 NAT .6497  
Weight (kg): ✓ 141.81

Material Description: PACKAGES IN DRUM

Packaging: DRUM SPECIAL

Detector Distance (in): 24'

Detector Filters: NONE

Dose Rate: 2.5

Comments: 1800  
A 3400/1388

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0129  
 File Name: 1388

Assay Date: 27-Mar-02  
 File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	3.48E+02	2.86E+01
Am-241	1.38E+02	2.78E+01
Np-237	1.38E-02	7.53E-04
U-238		
U-235		
Cs-137	9.22E-04	7.53E-05
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5  
 Weight (lbs): 312

Width (in): 22.5  
 Depth for TMU (in): 4

Depth (in): 22.5  
 % Volume: 50

Am-241 Calcs:

Measured	1.38E+02	+/-	1.38E+03	Calc from Pu-239
Calculated	4.82E+02	+/-	9.77E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.41E+02	+/-	1.14E+02
Pu-239	3.48E+02	+/-	2.82E+02
Pu-240	1.81E+02	+/-	1.47E+02
Pu-241	6.78E+02	+/-	5.49E+02
Pu-242	1.83E-01	+/-	1.48E-01
Am-241	4.82E+02	+/-	9.77E+02
Np-237	1.38E-02	+/-	1.11E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	9.22E-04	+/-	7.47E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	1.15E+03	+/-	1.03E+03	Calc from Pu-239 Act
Pu (g):	9.19E-01	Pu (g) + 3 sigma TMU:	3.15E+00	
		Pu(g) + 3 sigma:	1.15E+00	

Comments:

Am-241 from 722 keV peak. Errors:

Analyst:

Martin Winterrose

Date:

3/27/02

#Date & Time: Wed Mar 27 10:23:37 2002  
~g=SIMPLE\_CYLINDER  
~description=233S-01-0129  
~comment=DRUM\_WITH\_SAMPLES  
~Ccollimator=50MM-180D  
~crpn=4  
~Detector=7219  
~Convergence in %=1 ~MDRPN=4  
~Lunit=IN ~Tunit=C ~Dunit=G/CU.C ~Punit=MM.HG  
~at=20 ~ap=760 ~rh=50  
~Energies kev= 50.000, 100.000, 128.000, 130.000, 150.000, 200.000,#  
300.000, 500.000, 700.000, 1000.000, 1400.000, 2000.000,#  
4000.000,  
~Error in %= 10.000, 10.000, 10.000, 10.000, 10.000, 8.000,#  
8.000, 6.000, 6.000, 4.000, 4.000, 4.000,#  
4.000,  
~d1.1=0.0416 ~d1.2=22.5 ~d1.3=33.5 ~lmater=CSTEEL ~lden=7.86  
~d3.1=33 ~3mater=SAMPLEHS ~3den=0.7705 ~3con=1  
~sdl=24

C A N B E R R A I S O C S A N A L Y S I S

Report Generated On : 3/27/02 10:55:50 AM  
 Sample Title : 233s-01-0129  
 Spectrum Description :  
 Sample Identification : 1388  
 Sample Size : 141.8 kg  
 Sample Taken On : 3/27/02 10:24:00 AM  
 Acquisition Started : 3/27/02 10:25:16 AM

Live Time: 1800.0 seconds Real Time: 1824.8 seconds

ISOCs Calibration : 233S-01-0129  
 Energy Calibration Used Done On : 2/27/01  
 Efficiency Calibration Used Done On : 3/27/02

P E A K A N A L Y S I S R E P O R T

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.18	59.88	6.28E+005	22435.2	8.99E+003
2	300.98	75.33	2.87E+003	114.21	4.97E+003
3	340.49	85.20	9.91E+002	85.18	5.09E+003
4	349.12	87.36	4.19E+002	85.97	5.10E+003
5	396.05	99.09	5.95E+003	196.55	5.02E+003
6	413.56	103.46	3.21E+003	176.57	4.93E+003
7	445.32	111.40	1.11E+003	101.18	5.05E+003
8	460.80	115.27	6.60E+002	108.46	4.91E+003
9	502.36	125.65	1.22E+003	71.81	4.48E+003
10	518.52	129.69	4.71E+003	93.73	4.30E+003
11	577.14	144.34	2.53E+002	54.08	3.55E+003
12	596.16	149.10	3.82E+002	53.18	3.30E+003
13	815.24	203.85	6.57E+002	42.68	1.41E+003
14	833.11	208.32	2.05E+003	56.97	1.31E+003
15	1201.44	300.37	3.36E+002	30.20	5.87E+002
16	1248.37	312.09	1.85E+003	49.00	5.41E+002
17	1332.03	333.01	7.61E+002	35.94	4.80E+002
18	1343.20	335.80	2.95E+002	27.98	4.67E+002
19	1380.79	345.19	5.99E+002	37.15	4.10E+002
20	1474.11	368.51	1.83E+002	25.62	3.24E+002
21	1501.00	375.23	1.93E+003	48.22	3.07E+002
22	1521.54	380.37	3.88E+002	27.27	2.94E+002
23	1532.11	383.01	3.11E+002	24.08	2.86E+002
24	1572.33	393.06	6.80E+002	30.12	2.50E+002
25	1655.60	413.87	1.80E+003	45.46	2.01E+002
26	1690.66	422.63	1.04E+002	16.23	1.81E+002
27	1806.77	451.65	2.18E+002	18.37	1.31E+002
28	2043.81	510.89	1.37E+002	16.67	8.78E+001
29	2333.44	583.27	1.17E+002	13.98	7.15E+001
30	2437.85	609.37	1.24E+002	13.96	6.34E+001
31	2648.49	662.01	2.34E+002	17.62	5.82E+001
32	2888.47	721.99	5.21E+001	10.38	4.62E+001
33	3644.98	911.05	7.90E+001	10.82	3.60E+001

34 5846.55 1461.27 5.50E+002 24.09 8.49E+000

N U C L I D E   I D E N T I F I C A T I O N   R E P O R T

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.995	661.65*	85.12	9.22247E-004	7.53362E-005
NP-237	0.859	300.17*	6.20	1.43688E-002	1.46625E-003
		312.00*	36.00	1.37858E-002	7.53121E-004
		340.60	4.20		
		375.00*	0.68	8.04399E-001	4.07472E-002
		415.60*	1.75	3.01283E-001	1.45884E-002
Pu-239	0.995	129.28*	0.01	2.58700E+002	4.37404E+001
		375.00*	0.00	3.45688E+002	2.80190E+001
		413.70*	0.00	3.48171E+002	2.85628E+001
		451.50* @	0.00	3.45133E+002	3.21026E+001
AM-241	0.995	59.54*	35.70	9.64515E+001	8.40261E+000
		125.28*	0.00	1.08606E+002	8.27133E+000
		335.40*	0.00	1.62751E+002	1.72094E+001
		662.42* @	0.00	2.18060E+002	1.78031E+001
		722.70*	0.00	1.37972E+002	2.78116E+001
PU-241	0.944	114.00*	0.02	1.16584E+001	2.01838E+000
		332.60*	0.00	7.17295E+001	4.76733E+000

I N T E R F E R E N C E   C O R R E C T E D   R E P O R T

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg )	Wt mean Activity Uncertainty
CS-137	0.995	4.567677E-004	7.876601E-005
NP-237	0.859	1.399044E-002	6.694777E-004
Pu-239	@ 0.995	3.001794E+002	8.916800E+000
AM-241	@ 0.995	1.100600E+002	5.467699E+000
PU-241	0.944	2.078939E+001	1.858662E+000

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

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 \*\*\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg )	Nuclide MDA (uCi/kg )	Activity (uCi/kg )
	CO-60	1173.22	100.00	1.8856E-004	1.62E-004	-8.0840E-005
		1332.49	100.00	1.6175E-004		-9.2007E-005
	CS-134	475.35	1.46	1.9091E-002	2.64E-004	3.4243E-003
		563.23	8.38	2.7191E-003		2.3712E-003
		569.32	15.43	1.5142E-003		9.1734E-004
		604.70	97.60	2.9384E-004		-6.7748E-005
		795.84	85.40	2.6367E-004		2.2084E-004
		801.93	8.73	2.3585E-003		-1.5080E-003
		1038.57	1.00	1.9502E-002		8.1840E-003
		1167.94	1.80	1.0617E-002		7.0244E-003
		1365.15	3.04	5.2827E-003		9.1235E-004
+	CS-137	661.65*	85.12	1.5080E-004	1.51E-004	9.2225E-004
+	NP-237	300.17*	6.20	4.9391E-003	8.25E-004	1.4369E-002
		312.00*	36.00	8.2491E-004		1.3786E-002
		340.60	4.20	1.4350E-002		8.5740E-003
		375.00*	0.68	3.5067E-002		8.0440E-001
		415.60*	1.75	1.1465E-002		3.0128E-001
+	Pu-239	129.28*	0.01	1.6891E+001	1.32E+001	2.5870E+002
		375.00*	0.00	1.5070E+001		3.4569E+002
		413.70*	0.00	1.3250E+001		3.4817E+002
		451.50*	0.00	8.8796E+001		3.4513E+002
+	AM-241	59.54*	35.70	6.8148E-002	6.81E-002	9.6451E+001
		125.28*	0.00	2.7915E+001		1.0861E+002
		335.40*	0.00	5.7016E+001		1.6275E+002
		662.42*	0.00	3.5655E+001		2.1806E+002
		722.70*	0.00	9.0894E+001		1.3797E+002
+	PU-241	114.00*	0.02	5.8123E+000	5.81E+000	1.1658E+001
		332.60*	0.00	9.8645E+000		7.1730E+001
	CM-243	209.70	3.27	2.6797E-002	3.67E-003	1.5873E-001
		228.18	10.56	5.7782E-003		-8.9384E-004
		277.60	14.00	3.6682E-003		-3.3439E-003

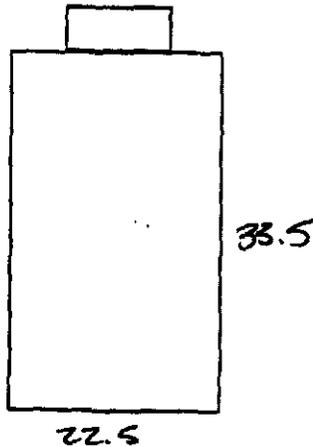
+ = Nuclide identified during the nuclide identification  
 \* = Energy line found in the spectrum  
 > = MDA value not calculated  
 @ = Half-life too short to be able to perform the decay correction

N U C L I D E T O T A L S

Nuclide	Mass (g)
Pu-239	6.87E-001 +/- 2.04E-002

**Bldg 233-S**  
**NDA Item Description Sheet**  
**Bottle or Cylinder Geometry**

*Replicate*



Put Dimensions on Bottle

~~NET W~~  
~~245 LBS~~  
~~111.36~~

Item ID: 233S-01-0129 REP

NET

Weight (kg): 370000 167kg

312 LBS  
141.81 kg

Material Description: Packages

Packaging: DRUM

Detector Distance (in): 24

Detector Filters: NONE

Dose Rate: 1.5

Comments: 14 1800 1880

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0129 Replicate  
 File Name: 1389

Assay Date: 27-Mar-02  
 File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	3.34E+02	2.77E+01
Am-241	1.97E+02	3.22E+01
Np-237	1.39E-02	7.60E-04
U-238		
U-235		
Cs-137	5.74E-04	1.45E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal

Item Type: Barrel

Calcs: Use 1st

Dimensions:

Length (in): 33.5  
 Weight (lbs): 312

Width (in): 22.5  
 Depth for TMU (in): 4

Depth (in): 22.5  
 % Volume: 50

Am-241 Calcs:

Measured	1.97E+02	+/-	1.97E+03	Calc from Pu-239
Calculated	4.62E+02	+/-	9.36E+02	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.35E+02	+/-	1.10E+02
Pu-239	3.34E+02	+/-	2.70E+02
Pu-240	1.74E+02	+/-	1.41E+02
Pu-241	6.50E+02	+/-	5.27E+02
Pu-242	1.76E-01	+/-	1.42E-01
Am-241	4.62E+02	+/-	9.36E+02
Np-237	1.39E-02	+/-	1.12E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	5.74E-04	+/-	4.85E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	1.10E+03	+/-	9.91E+02	Calc from Pu-239 Act
Pu (g):	8.81E-01	Pu (g) + 3 sigma TMU:	3.02E+00	
		Pu(g) + 3 sigma:	1.10E+00	

Comments:

Replicate passed Am-241 from 722 keV peak. Errors:

Analyst:

Martin Winterrose

Date: 3/27/02

#Date & Time: Wed Mar 27 10:23:37 2002

~g=SIMPLE\_CYLINDER

~description=233S-01-0129

~comment=DRUM WITH SAMPLES

~Collimator=50MM-180D

~crpn=4

~Detector=7219

~Convergence in %=1

~MDRPN=4

~Lunit=IN ~Tunit=C ~Dunit=G/CU.C ~Punit=MM.HG

~at=20 ~ap=760 ~rh=50

~Energies kev= 50.000, 100.000, 128.000, 130.000, 150.000, 200.000, #  
300.000, 500.000, 700.000, 1000.000, 1400.000, 2000.000, #  
4000.000,

~Error in %= 10.000, 10.000, 10.000, 10.000, 10.000, 8.000, #  
8.000, 6.000, 6.000, 4.000, 4.000, 4.000, #  
4.000,

~dl.1=0.0416 ~dl.2=22.5 ~dl.3=33.5 ~lmater=CSTEEL ~lden=7.86

~d3.1=33 ~3mater=SAMPLEHS ~3den=0.7705 ~3con=1

~sdl=24

C A N B E R R A I S O C S A N A L Y S I S

Report Generated On : 3/27/02 11:30:03 AM  
 Sample Title : 233s-01-0129 Replicate  
 Spectrum Description :  
 Sample Identification : 1389  
 Sample Size : 141.8 kg  
 Sample Taken On : 3/27/02 10:59:00 AM  
 Acquisition Started : 3/27/02 10:59:30 AM

Live Time: 1800.0 seconds Real Time: 1824.6 seconds

ISOCS Calabration : 233S-01-0129  
 Energy Calibration Used Done On : 2/27/01  
 Efficiency Calibration Used Done On : 3/27/02

P E A K A N A L Y S I S R E P O R T

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.17	59.88	6.24E+005	22183.1	9.41E+003
2	301.06	75.35	2.61E+003	136.21	5.03E+003
3	340.55	85.22	1.22E+003	79.20	5.17E+003
4	349.73	87.51	4.63E+002	74.69	5.18E+003
5	396.04	99.08	5.94E+003	248.20	5.10E+003
6	413.71	103.50	3.41E+003	164.15	5.00E+003
7	445.42	111.42	1.29E+003	122.11	5.11E+003
8	458.07	114.58	4.95E+002	124.09	5.00E+003
9	502.28	125.63	1.32E+003	73.62	4.50E+003
10	518.42	129.67	4.80E+003	93.82	4.28E+003
11	576.42	144.16	1.59E+002	63.14	3.59E+003
12	596.40	149.16	3.33E+002	57.46	3.36E+003
13	815.47	203.91	6.30E+002	41.95	1.38E+003
14	833.23	208.34	2.12E+003	57.31	1.26E+003
15	1201.16	300.30	2.82E+002	28.07	5.55E+002
16	1248.39	312.10	1.87E+003	49.16	4.76E+002
17	1331.81	332.95	7.91E+002	36.17	4.27E+002
18	1343.02	335.75	3.62E+002	29.23	4.19E+002
19	1364.76	341.18	2.72E+002	38.97	4.02E+002
20	1380.53	345.13	6.31E+002	47.53	3.87E+002
21	1473.92	368.47	2.31E+002	23.50	3.19E+002
22	1500.96	375.22	1.83E+003	47.18	3.00E+002
23	1521.74	380.42	3.49E+002	33.33	2.83E+002
24	1532.24	383.04	2.84E+002	24.34	2.76E+002
25	1572.48	393.10	6.38E+002	29.86	2.46E+002
26	1655.69	413.89	1.73E+003	49.51	1.94E+002
27	1691.71	422.89	1.07E+002	16.23	1.68E+002
28	1806.27	451.53	2.06E+002	18.30	1.33E+002
29	2043.84	510.90	1.54E+002	18.97	9.57E+001
30	2333.35	583.25	7.64E+001	12.46	7.42E+001
31	2437.88	609.38	1.01E+002	13.03	6.00E+001
32	2646.69	661.56	1.46E+002	36.47	5.33E+001
33	2649.72	662.32	1.01E+002	35.88	5.40E+001

34	2889.00	722.12	7.45E+001	11.95	4.54E+001
35	3644.72	910.99	5.76E+001	9.72	2.87E+001
36	5846.97	1461.37	5.74E+002	24.62	1.01E+001
37	7064.88	1765.75	3.68E+001	7.26	2.33E+000

N U C L I D E   I D E N T I F I C A T I O N   R E P O R T

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	5.74229E-004	1.45019E-004
NP-237	0.994	300.17*	6.20	1.20603E-002	1.33413E-003
		312.00*	36.00	1.39427E-002	7.60294E-004
		340.60*	4.20	1.77690E-002	2.67659E-003
		375.00*	0.68	7.60266E-001	3.88424E-002
		415.60*	1.75	2.88736E-001	1.45212E-002
Pu-239	0.996	129.28*	0.01	2.63468E+002	4.45371E+001
		375.00*	0.00	3.26722E+002	2.65708E+001
		413.70*	0.00	3.33672E+002	2.77465E+001
		451.50* @	0.00	3.25606E+002	3.16738E+001
AM-241	0.995	59.54*	35.70	9.58435E+001	8.34310E+000
		125.28*	0.00	1.17469E+002	8.67333E+000
		335.40*	0.00	1.99996E+002	1.86320E+001
		662.42* @	0.00	9.42144E+001	3.36104E+001
		722.70*	0.00	1.97134E+002	3.22075E+001
PU-241	0.987	114.00*	0.02	8.85107E+000	2.26942E+000
		332.60*	0.00	7.45356E+001	4.87596E+000

I N T E R F E R E N C E   C O R R E C T E D   R E P O R T

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg )	Wt mean Activity Uncertainty
CS-137	1.000	5.742288E-004	1.450190E-004
NP-237	0.994	1.378291E-002	6.409354E-004
Pu-239	@ 0.996	2.946895E+002	8.853850E+000
AM-241	@ 0.995	1.175912E+002	5.633996E+000
PU-241	0.987	2.054648E+001	2.057481E+000

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

\*\*\*\*\*  
 \*\*\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
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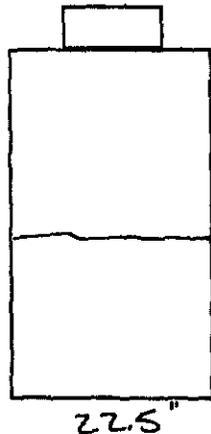
	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg )	Nuclide MDA (uCi/kg )	Activity (uCi/kg )
	CO-60	1173.22	100.00	2.0310E-004	1.57E-004	4.0008E-005
		1332.49	100.00	1.5681E-004		8.4158E-005
	CS-134	475.35	1.46	1.7830E-002	2.32E-004	2.4546E-003
		563.23	8.38	2.8835E-003		-9.0281E-004
		569.32	15.43	1.5045E-003		-1.3462E-003
		604.70	97.60	2.7436E-004		-7.2625E-006
		795.84	85.40	2.3238E-004		2.2772E-005
		801.93	8.73	2.2448E-003		-1.0140E-003
		1038.57	1.00	2.0890E-002		8.9858E-003
		1167.94	1.80	1.0923E-002		-2.4065E-003
		1365.15	3.04	4.6244E-003		-4.3326E-004
+	CS-137	661.65*	85.12	1.4473E-004	1.45E-004	5.7423E-004
+	NP-237	300.17*	6.20	4.8050E-003	7.75E-004	1.2060E-002
		312.00*	36.00	7.7508E-004		1.3943E-002
		340.60*	4.20	6.2777E-003		1.7769E-002
		375.00*	0.68	3.4624E-002		7.6027E-001
		415.60*	1.75	1.1262E-002		2.8874E-001
+	Pu-239	129.28*	0.01	1.6859E+001	1.30E+001	2.6347E+002
		375.00*	0.00	1.4880E+001		3.2672E+002
		413.70*	0.00	1.3014E+001		3.3367E+002
		451.50*	0.00	8.9146E+001		3.2561E+002
+	AM-241	59.54*	35.70	6.9737E-002	6.97E-002	9.5843E+001
		125.28*	0.00	2.7981E+001		1.1747E+002
		335.40*	0.00	5.4053E+001		2.0000E+002
		662.42*	0.00	3.4438E+001		9.4214E+001
		722.70*	0.00	9.0172E+001		1.9713E+002
+	PU-241	114.00*	0.02	5.9252E+000	5.93E+000	8.8511E+000
		332.60*	0.00	9.3127E+000		7.4536E+001
	CM-243	209.70	3.27	2.6641E-002	3.78E-003	1.6260E-001
		228.18	10.56	5.7485E-003		-1.1927E-003
		277.60	14.00	3.7774E-003		1.7941E-003

+ = Nuclide identified during the nuclide identification  
 \* = Energy line found in the spectrum  
 > = MDA value not calculated  
 @ = Half-life too short to be able to perform the decay correction

N U C L I D E T O T A L S

Nuclide	Mass (g)
Pu-239	6.74E-001 +/- 2.03E-002

**Bldg 233-S**  
**NDA Item Description Sheet**  
**Bottle or Cylinder Geometry**



WEIGHTS USED FROM  
INVENTORY

157 LBS GROSS  
- 58 DRUM  
- 12 LINER  
NET 87 LBS

.1200% DIRT 10 LBS 10%  
.0967  
.5252 METAL 76 LBS 90%

WASTE WT FROM INVEN.  
86 LBS  
39.109 kg  
USED FOR ANALYSIS

Put Dimensions on Bottle

Item ID: 2335-01-0131

Weight (kg): 157 LBS 71.3 kg

Material Description: METAL & DIRT

Packaging: DRUM 55 GAL

Detector Distance (in): 78"

Detector Filters: CoD 10325 + 90 MIL LINER

Dose Rate: 100/20

Comments: DRUM 14 LBS 90 MIL LINER

1800 1372  
HIGH NP-237 ACTIVITY - 375 KEV LINES NOTE  
USED IN ANALYSIS. AFFECTED BY HIGH NP-237 ACTIVITY

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID:   
 File Name:

Assay Date:   
 File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	2.55E+04	2.09E+03
Am-241	2.95E+04	1.16E+03
Np-237	5.69E+01	2.74E+00
U-238	1.34E+00	6.85E-02
U-235	2.52E-02	6.01E-03
Cs-137	3.13E-02	2.55E-03
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination:

Item Type:

Calcs:

Dimensions:

Length (in):   
 Weight (lbs):

Width (in):   
 Depth for TMU (in):

Depth (in):   
 % Volume:

Am-241 Calcs:

Measured	2.95E+04	+/-	3.18E+04	Calc from Pu-239
Calculated	3.53E+04	+/-	2.34E+04	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	1.03E+04	+/-	2.47E+03
Pu-239	2.55E+04	+/-	6.09E+03
Pu-240	1.33E+04	+/-	3.18E+03
Pu-241	4.97E+04	+/-	1.19E+04
Pu-242	1.34E+01	+/-	3.21E+00
Am-241	3.53E+04	+/-	2.34E+04
Np-237	5.69E+01	+/-	1.30E+01
U-238	1.34E+00	+/-	3.07E-01
U-235	2.52E-02	+/-	8.24E-03
Cs-137	3.13E-02	+/-	7.44E-03
Co-60	0.00E+00	+/-	0.00E+00

Results:

Total TRU Activity(nCi/g):	8.45E+04	+/-	2.45E+04	Calc from Pu-239 Act
Pu (g):	1.88E+01	Pu (g) + 3 sigma TMU:	3.22E+01	
		Pu(g) + 3 sigma:	2.34E+01	

Comments:

High NP-237 ratio does not affect final results. Am-241 from 722 keV peak. Errors: High Np-237 ratio,

Analyst:

Date:

#Date & Time: Tue Mar 19 10:44:15 2002

~g=SIMPLE\_CYLINDER  
~description=233S-01-0131A  
~comment=DRUM\_WITH\_SAMPLES  
~Ccollimator=50MM-180D  
~crpn=4

~Detector=7219

~Convergence in %=1 ~MDRPN=4

~Lunit=IN ~Tunit=C ~Dunit=G/CU.C ~Punit=MM.HG

~at=20 ~ap=760 ~rh=50

~Energies kev= 50.000, 100.000, 128.000, 130.000, 150.000, 200.000,#  
300.000, 500.000, 700.000, 1000.000, 1400.000, 2000.000,#  
4000.000,

~Error in %= 10.000, 10.000, 10.000, 10.000, 10.000, 8.000,#  
8.000, 6.000, 6.000, 4.000, 4.000, 4.000,#  
4.000,

~d1.1=0.0416 ~d1.2=22.5 ~d1.3=33.5 ~lmater=CSTEEL ~lden=7.86

~d2.1=7.5 ~2mater=DRYDIRT ~2den=0.0967 ~2con=0.4

~d3.1=10.5 ~3mater=304SS ~3den=0.5252 ~3con=0.6

~lAbsor=0.0625 ~lAmater=CADMIUM ~lAden=8.642

~sdl=28

C A N B E R R A I S O C S A N A L Y S I S

Report Generated On : 3/19/02 11:19:47 AM  
 Sample Title : 233s-01-0131  
 Spectrum Description :  
 Sample Identification : 1372  
 Sample Size : 39.1 kg  
 Sample Taken On : 3/18/02 1:09:00 PM  
 Acquisition Started : 3/18/02 1:09:23 PM

Live Time: 1800.0 seconds Real Time: 2002.4 seconds

ISOCS Calabration : 233S-01-0131A  
 Energy Calibration Used Done On : 2/27/01  
 Efficiency Calibration Used Done On : 3/19/02

P E A K A N A L Y S I S R E P O R T

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.28	59.90	5.38E+003	223.42	9.01E+004
2	291.93	73.06	5.54E+004	2663.07	9.44E+004
3	301.06	75.35	1.04E+005	3227.07	9.52E+004
4	340.01	85.08	3.85E+004	3151.14	1.02E+005
5	379.66	94.99	2.64E+004	1328.31	1.10E+005
6	395.55	98.96	8.60E+004	1888.54	1.13E+005
7	413.87	103.54	3.48E+004	1472.41	1.15E+005
8	445.66	111.48	4.66E+004	2163.04	1.28E+005
9	460.06	115.08	2.12E+004	1198.44	1.30E+005
10	502.44	125.67	1.69E+004	724.89	1.36E+005
11	518.53	129.69	3.98E+004	498.52	1.39E+005
12	574.50	143.68	9.89E+003	579.11	1.44E+005
13	743.96	186.03	1.17E+003	313.74	1.40E+005
14	781.56	195.43	7.86E+003	414.57	1.33E+005
15	815.06	203.80	1.22E+004	610.92	1.26E+005
16	833.23	208.34	7.41E+004	526.42	1.22E+005
17	851.17	212.83	6.09E+003	309.79	1.18E+005
18	952.71	238.20	3.06E+003	282.19	1.10E+005
19	994.75	248.71	3.54E+003	279.27	1.13E+005
20	1022.41	255.62	1.81E+003	289.04	1.09E+005
21	1034.45	258.63	1.55E+003	324.24	1.06E+005
22	1071.26	267.83	2.08E+003	292.02	9.80E+004
23	1087.24	271.83	1.67E+004	346.99	9.38E+004
24	1201.43	300.36	3.51E+005	2585.59	5.22E+004
25	1248.46	312.12	2.07E+006	11024.4	3.25E+004
26	1291.49	322.87	2.87E+003	257.82	2.17E+004
27	1331.17	332.79	1.41E+004	1493.34	1.93E+004
28	1362.79	340.69	2.40E+005	5286.68	1.61E+004
29	1377.52	344.37	4.51E+003	1679.71	1.39E+004
30	1474.73	368.67	6.18E+003	407.83	8.96E+003
31	1501.85	375.45	7.29E+004	1104.92	8.27E+003
32	1523.64	380.89	3.95E+003	1055.50	7.64E+003
33	1534.04	383.49	3.87E+003	751.31	7.35E+003

34	1572.50	393.10	1.19E+004	218.31	6.20E+003
35	1594.72	398.65	7.39E+004	397.21	5.52E+003
36	1645.51	411.35	3.00E+002	336.16	4.12E+003
37	1656.11	414.00	3.47E+004	895.01	3.82E+003
38	1663.72	415.90	9.03E+004	1233.88	3.60E+003
39	1691.34	422.80	2.42E+003	82.85	2.76E+003
40	1707.14	426.75	7.36E+002	53.80	2.35E+003
41	1806.73	451.64	4.34E+003	87.84	1.69E+003
42	2044.39	511.04	4.27E+002	37.56	1.18E+003

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	2333.47	583.28	6.83E+002	36.67	7.74E+002
44	2447.70	611.83	4.51E+002	41.72	5.86E+002
45	2476.06	618.92	9.24E+002	42.36	5.37E+002
46	2494.79	623.60	1.39E+003	46.04	5.04E+002
47	2563.50	640.77	2.44E+002	32.13	4.20E+002
48	2584.90	646.12	2.25E+002	27.45	3.98E+002
49	2610.91	652.62	1.02E+003	43.72	3.72E+002
50	2646.83	661.60	2.17E+003	163.34	3.23E+002
51	2649.90	662.36	6.20E+003	155.77	3.18E+002
52	2754.98	688.62	5.16E+002	36.07	2.66E+002
53	2839.74	709.81	1.78E+002	19.42	2.16E+002
54	2888.35	721.96	3.10E+003	76.79	1.89E+002
55	2907.65	726.78	1.97E+002	25.37	1.78E+002
56	2948.56	737.01	8.39E+001	16.75	1.55E+002
57	3024.61	756.01	1.64E+002	17.51	1.40E+002
58	3067.02	766.61	4.11E+002	27.41	1.41E+002
59	3077.95	769.34	1.93E+002	22.12	1.40E+002
60	3443.09	860.60	9.19E+001	13.59	9.03E+001
61	3483.86	870.79	3.56E+002	21.46	9.27E+001
62	4005.47	1001.15	6.18E+002	26.36	5.90E+001
63	5100.83	1274.90	1.26E+002	13.23	3.04E+001
64	5846.99	1461.38	5.05E+002	23.24	1.51E+001
65	7063.83	1765.49	4.76E+001	8.32	6.22E+000

N U C L I D E   I D E N T I F I C A T I O N   R E P O R T

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	3.12764E-002	2.55201E-003
PA-234M	0.999	1001.03*	0.59	1.33761E+000	6.85289E-002
U-235	0.991	143.76*	10.50	1.63138E+000	1.71390E-001
		185.71*	54.00	2.20186E-002	6.01700E-003
		205.31*	4.70	2.46397E+000	2.67227E-001
		300.17*	6.20	5.49592E+001	2.68230E+000
NP-237	0.999	312.00*	36.00	5.69321E+001	2.73852E+000
		340.60*	4.20	5.87000E+001	3.01030E+000
		415.76*	1.75	5.76063E+001	2.50104E+000
		129.28*	0.01	1.66093E+004	2.79653E+003
Pu-239	0.994	413.70*	0.00	2.55341E+004	2.09954E+003
		451.50* @	0.00	2.62605E+004	1.15819E+003
AM-241	0.988	59.54*	35.70	1.41864E+004	1.27211E+003
		125.28*	0.00	1.27648E+004	8.25377E+002
		335.40	0.00		
		662.42* @	0.00	2.11584E+004	8.49816E+002
PU-241	0.959	722.70*	0.00	2.94840E+004	1.16382E+003
		114.00*	0.02	4.59872E+003	3.60550E+002
		332.60*	0.00	4.95880E+003	5.73287E+002

I N T E R F E R E N C E   C O R R E C T E D   R E P O R T

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg )	Wt mean Activity Uncertainty
CS-137	1.000	3.127643E-002	2.552015E-003
PA-234M	0.999	1.337608E+000	6.852892E-002
U-235	0.991	2.523457E-002	6.011775E-003
NP-237	0.999	5.698493E+001	1.357623E+000
Pu-239 @	0.994	2.231698E+004	1.679012E+003
AM-241 @	0.988	1.744665E+004	5.950551E+002
PU-241	0.959	4.700775E+003	3.052071E+002

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

N U C L I D E   T O T A L S

Nuclide	Mass (g)
U-235	4.48E-001 +/- 1.07E-001
Pu-239	1.41E+001 +/- 1.06E+000

1000-040402-0001

\*\*\*\*\*  
 \*\*\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg )	Nuclide MDA (uCi/kg )	Activity (uCi/kg )
	CO-60	1173.22	100.00	7.5827E-004	6.18E-004	-1.4955E-004
		1332.49	100.00	6.1805E-004		-1.6873E-004
	CS-134	475.35	1.46	2.3357E-001	1.32E-003	-3.4584E-001
		563.23	8.38	3.1307E-002		-1.8342E-002
		569.32	15.43	1.7029E-002		-3.6387E-003
		604.70	97.60	2.6311E-003		-7.4290E-003
		795.84	85.40	1.3245E-003		-2.0556E-004
		801.93	8.73	1.3064E-002		-2.7818E-003
		1038.57	1.00	8.1300E-002		1.2369E-002
		1167.94	1.80	4.3499E-002		1.8317E-002
		1365.15	3.04	2.2218E-002		1.4436E-002
+	CS-137	661.65*	85.12	1.2442E-003	1.24E-003	3.1276E-002
+	NP-237	300.17*	6.20	1.6709E-001	2.31E-002	5.4959E+001
		312.00*	36.00	2.3094E-002		5.6932E+001
		340.60*	4.20	1.4472E-001		5.8700E+001
		415.76*	1.75	1.7989E-001		5.7606E+001
+	Pu-239	129.28*	0.01	7.2473E+002	2.14E+002	1.6609E+004
		413.70*	0.00	2.1375E+002		2.5534E+004
		451.50*	0.00	1.1757E+003		2.6260E+004
+	AM-241	59.54*	35.70	3.6921E+003	2.92E+002	1.4186E+004
		125.28*	0.00	1.2961E+003		1.2765E+004
		335.40	0.00	3.7208E+003		2.1663E+004
		662.42*	0.00	2.9220E+002		2.1158E+004
		722.70*	0.00	6.3415E+002		2.9484E+004
+	PU-241	114.00*	0.02	3.6442E+002	2.28E+002	4.5987E+003
		332.60*	0.00	2.2780E+002		4.9588E+003
	CM-243	209.70	3.27	8.2340E-001	1.63E-001	2.1193E+001
		228.18	10.56	2.1230E-001		1.0764E-002
		277.60	14.00	1.6304E-001		-3.5124E-002

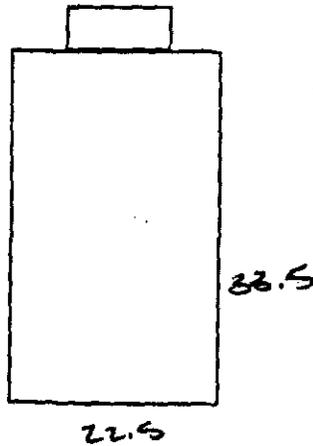
+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

> = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

**Bldg 233-S**  
**NDA Item Description Sheet**  
**Bottle or Cylinder Geometry**



Put Dimensions on Bottle

Item ID: 2885-01-0132

Weight (kg): 177 389.4 LBS

150.63 NET

Material Description: Packaging in Drum

Packaging: Drum

Detector Distance (in): 24

Detector Filters: None

Dose Rate: \_\_\_\_\_

Comments: 1800 - 1395

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**233-S Item Analysis**

Spreadsheet Version 3.0b

1/14/02

**Sample Info:**

Item ID: **233s-01-0132**  
 File Name: **1395**

Assay Date: **1-Apr-02**  
 File Name:

**Data Input:**

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	1.55E+03	1.22E+02
Am-241	6.26E+02	4.81E+01
Np-237	2.68E-02	1.37E-03
U-238		
U-235		
Cs-137	8.65E-04	1.32E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

**Item Parameters:**

Contamination: **Internal**

Item Type: **Barrel**

Calcs: **Use 1st**

**Dimensions:**

Length (in): **33.5**  
 Weight (lbs): **331.4**

Width (in): **22.5**  
 Depth for TMU (in): **4**

Depth (in): **22.5**  
 % Volume: **50**

**Am-241 Calcs:**

Measured	6.26E+02	+/-	6.27E+03	Calc from Pu-239
Calculated	2.14E+03	+/-	4.33E+03	

**Nuclide Activities:**

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	6.26E+02	+/-	5.07E+02
Pu-239	1.55E+03	+/-	1.25E+03
Pu-240	8.05E+02	+/-	6.52E+02
Pu-241	3.01E+03	+/-	2.44E+03
Pu-242	8.13E-01	+/-	6.59E-01
Am-241	2.14E+03	+/-	4.33E+03
Np-237	2.68E-02	+/-	2.16E-02
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	8.65E-04	+/-	7.10E-04
Co-60	0.00E+00	+/-	0.00E+00

**Results:**

<b>Total TRU Activity(nCi/g):</b>	5.12E+03	+/-	4.59E+03	Calc from Pu-239 Act
<b>Pu (g):</b>	4.33E+00	<b>Pu (g) + 3 sigma TMU:</b>	1.49E+01	
		<b>Pu(g) + 3 sigma:</b>	5.36E+00	

**Comments:**

Am-241 from 722 keV peak. Errors:

**Analyst:**

**Martin Winterrose**

**Date: 4/1/02**

#Date & Time: Mon Apr 01 13:56:18 2002  
~g=SIMPLE\_CYLINDER  
~description=233S-01-0132  
~comment=DRUM WITH SAMPLES  
~Ccollimator=50MM-180D  
~crpn=4  
~Detector=7219  
~Convergence in %=1 ~MDRPN=4  
~Lunit=IN ~Tunit=C ~Dunit=G/CU.C ~Punit=MM.HG  
~at=20 ~ap=760 ~rh=50  
~Energies kev= 50.000, 100.000, 128.000, 130.000, 150.000, 200.000, #  
300.000, 500.000, 700.000, 1000.000, 1400.000, 2000.000, #  
4000.000,  
~Error in %= 10.000, 10.000, 10.000, 10.000, 10.000, 8.000, #  
8.000, 6.000, 6.000, 4.000, 4.000, 4.000, #  
4.000,  
~d1.1=0.0416 ~d1.2=22.5 ~d1.3=33.5 ~1mater=CSTEEL ~1den=7.86  
~d3.1=33 ~3mater=SAMPLEHS ~3den=0.6903 ~3con=1  
~sd1=24

CANBERRA ISOCS ANALYSIS

Report Generated On : 4/01/02 2:29:04 PM

Sample Title : 233s-01-0132

Spectrum Description :

Sample Identification : 1395

Sample Size : 150.6 kg

Sample Taken On : 4/01/02 1:50:00 PM

Acquisition Started : 4/01/02 1:57:42 PM

Live Time: 1800.0 seconds Real Time: 1872.3 seconds

ISOCS Calabration : 233S-01-0132

Energy Calibration Used Done On : 2/27/01

Efficiency Calibration Used Done On : 4/01/02

PEAK ANALYSIS REPORT

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.17	59.88	1.84E+006	63490.9	3.13E+004
2	291.96	73.07	4.17E+003	244.14	1.55E+004
3	301.03	75.34	7.87E+003	271.65	1.56E+004
4	340.05	85.09	3.39E+003	170.85	1.50E+004
5	350.25	87.64	1.13E+003	141.83	1.48E+004
6	395.91	99.05	3.06E+004	1133.63	1.37E+004
7	413.82	103.53	1.56E+004	933.89	1.31E+004
8	445.35	111.41	6.83E+003	387.13	1.29E+004
9	460.27	115.14	3.60E+003	507.83	1.22E+004
10	502.38	125.66	5.24E+003	310.36	1.04E+004
11	518.54	129.70	2.83E+004	306.35	9.54E+003
12	577.37	144.40	9.24E+002	148.08	7.69E+003
13	587.25	146.87	7.85E+002	203.98	7.54E+003
14	595.82	149.01	1.56E+003	100.15	7.42E+003
15	644.68	161.22	9.05E+002	101.54	6.65E+003
16	660.43	165.16	4.88E+002	89.29	6.39E+003
17	686.14	171.58	6.75E+002	70.72	6.35E+003
18	758.94	189.78	4.50E+002	63.08	5.10E+003
19	783.69	195.96	7.03E+002	64.58	4.74E+003
20	815.77	203.98	3.92E+003	132.29	4.23E+003
21	833.21	208.34	8.23E+003	133.47	3.95E+003
22	1022.56	255.66	5.65E+002	48.90	2.49E+003
23	1191.83	297.97	2.78E+002	43.07	1.84E+003
24	1201.37	300.35	6.12E+002	46.20	1.79E+003
25	1248.59	312.15	4.18E+003	75.78	1.66E+003
26	1285.56	321.39	3.28E+002	82.48	1.52E+003
27	1332.10	333.02	3.94E+003	74.72	1.42E+003
28	1343.32	335.82	1.39E+003	54.64	1.37E+003
29	1381.12	345.27	3.54E+003	153.80	1.19E+003
30	1473.90	368.46	1.03E+003	96.71	8.74E+002
31	1501.14	375.27	1.03E+004	140.01	7.84E+002
32	1522.13	380.51	1.82E+003	87.71	7.15E+002
33	1531.77	382.92	1000.9404020001 1.74E+003	49.97 126	6.82E+002

34	1572.61	393.13	3.41E+003	77.68	5.81E+002
35	1655.79	413.92	9.27E+003	123.13	4.23E+002
36	1691.03	422.73	6.63E+002	29.93	3.48E+002
37	1707.70	426.89	1.84E+002	21.71	3.17E+002
38	1806.77	451.65	1.10E+003	37.22	2.32E+002
39	2045.39	511.29	1.85E+002	18.55	1.47E+002
40	2333.45	583.28	1.14E+002	14.55	9.19E+001
41	2437.74	609.34	9.32E+001	13.59	8.92E+001
42	2476.28	618.97	1.39E+002	15.00	8.71E+001

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	2584.15	645.93	7.29E+001	13.25	8.40E+001
44	2646.19	661.44	2.52E+002	37.71	7.88E+001
45	2649.24	662.20	8.29E+002	44.08	7.83E+001
46	2888.48	721.99	2.72E+002	19.10	5.25E+001
47	3482.23	870.38	6.56E+001	10.57	4.21E+001
48	3645.74	911.24	8.07E+001	11.12	3.22E+001
49	3876.93	969.02	5.01E+001	9.61	2.80E+001
50	5847.23	1461.44	5.70E+002	24.60	1.02E+001
51	7065.44	1765.89	4.66E+001	7.90	2.37E+000

| N U C L I D E I D E N T I F I C A T I O N R E P O R T |

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Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	0.998	661.65*	85.12	8.65494E-004	1.32262E-004
NP-237	0.859	300.17*	6.20	2.25103E-002	2.01668E-003
		312.00*	36.00	2.67719E-002	1.36863E-003
		340.60	4.20		
		375.00*	0.68	3.69203E+000	1.70337E-001
		415.60*	1.75	1.33716E+000	5.80693E-002
Pu-239	0.995	129.28*	0.01	1.31999E+003	2.22093E+002
		375.00*	0.00	1.58664E+003	1.24247E+002
		413.70*	0.00	1.54526E+003	1.22372E+002
		451.50* @	0.00	1.51344E+003	7.82103E+001
		59.54*	35.70	2.38018E+002	2.06256E+001
AM-241	0.995	125.28*	0.00	3.95486E+002	3.02798E+001
		335.40*	0.00	6.60228E+002	4.02693E+001
		662.42* @	0.00	6.72636E+002	4.15334E+001
		722.70*	0.00	6.26203E+002	4.80673E+001
		114.00*	0.02	5.41815E+001	8.18503E+000
PU-241	0.954	332.60*	0.00	3.19708E+002	1.61356E+001

| I N T E R F E R E N C E C O R R E C T E D R E P O R T |

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Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg )	Wt mean Activity Uncertainty
CS-137	0.998	8.654937E-004	1.322618E-004
NP-237	0.859	2.545903E-002	1.132348E-003
Pu-239 @	0.995	1.458473E+003	3.895728E+001
AM-241 @	0.995	3.716516E+002	1.492238E+001
PU-241	0.954	1.085230E+002	7.299579E+000

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

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 \*\*\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
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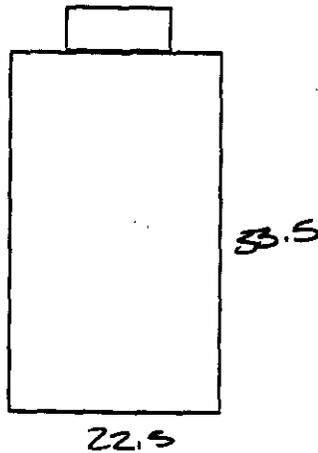
Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg )	Nuclide MDA (uCi/kg )	Activity (uCi/kg )
CO-60	1173.22	100.00	1.8076E-004	1.56E-004	1.4362E-004
	1332.49	100.00	1.5571E-004		5.4017E-005
CS-134	475.35	1.46	1.8511E-002	2.12E-004	-5.5801E-003
	563.23	8.38	2.8649E-003		-5.6039E-004
	569.32	15.43	1.6098E-003		-7.3045E-004
	604.70	97.60	2.7418E-004		-9.9154E-005
	795.84	85.40	2.1204E-004		-1.7973E-004
	801.93	8.73	2.2682E-003		8.7118E-005
	1038.57	1.00	1.8658E-002		8.9778E-003
	1167.94	1.80	9.9030E-003		4.3803E-003
	1365.15	3.04	4.7642E-003		1.1948E-003
	+ CS-137	661.65*	85.12		1.5106E-004
+ NP-237	300.17*	6.20	7.3487E-003	1.23E-003	2.2510E-002
	312.00*	36.00	1.2285E-003		2.6772E-002
	340.60	4.20	2.3705E-002		2.9999E-002
	375.00*	0.68	4.7728E-002		3.6920E+000
	415.60*	1.75	1.4192E-002		1.3372E+000
+ Pu-239	129.28*	0.01	2.1338E+001	1.64E+001	1.3200E+003
	375.00*	0.00	2.0511E+001		1.5866E+003
	413.70*	0.00	1.6400E+001		1.5453E+003
	451.50*	0.00	1.0080E+002		1.5134E+003
+ AM-241	59.54*	35.70	1.0702E-001	1.07E-001	2.3802E+002
	125.28*	0.00	3.6037E+001		3.9549E+002
	335.40*	0.00	8.3044E+001		6.6023E+002
	662.42*	0.00	3.5606E+001		6.7264E+002
	722.70*	0.00	8.3986E+001		6.2620E+002
+ PU-241	114.00*	0.02	7.7856E+000	7.79E+000	5.4182E+001
	332.60*	0.00	1.4448E+001		3.1971E+002
CM-243	209.70	3.27	4.2098E-002	5.41E-003	5.3248E-001
	228.18	10.56	8.5143E-003		-6.4045E-003
	277.60	14.00	5.4144E-003		5.7650E-004

+ = Nuclide identified during the nuclide identification  
 \* = Energy line found in the spectrum  
 > = MDA value not calculated  
 @ = Half-life too short to be able to perform the decay correction

N U C L I D E T O T A L S

Nuclide	Mass (g)
Pu-239	3.54E+000 +/- 9.47E-002

**Bldg 233-S**  
**NDA Item Description Sheet**  
**Bottle or Cylinder Geometry**



Put Dimensions on Bottle

0.6393

Item ID: 2335-01-0133

139.6 kg

Weight (kg): 166.1 kg 365.2 lbs - 307.2 WRT

Material Description: PACIFIERS IN DRUM

Packaging: DRUM

Detector Distance (in): 24

Detector Filters: None

Dose Rate: L.S

Comments: 1800 1394

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\_\_\_\_\_  
\_\_\_\_\_

233-S Item Analysis

Spreadsheet Version 3.0b

1/14/02

Sample Info:

Item ID: 233s-01-0133  
 File Name: 1394

Assay Date: 1-Apr-02  
 File Name:

Data Input:

Isotope	Activity (uCi/kg)	Meas Uncert
Pu-239 (129)		
Pu-239 (414)	1.00E+03	7.94E+01
Am-241	4.42E+02	4.07E+01
Np-237	1.05E-02	6.01E-04
U-238		
U-235		
Cs-137	2.34E-04	1.52E-04
Co-60		

Activity (uCi/kg)	Meas Uncert

Item Parameters:

Contamination: Internal      Item Type: Barrel      Calcs: Use 1st

Dimensions:

Length (in): 33.5      Width (in): 22.5      Depth (in): 22.5  
 Weight (lbs): 307      Depth for TMU (in): 4      % Volume: 50

Am-241 Calcs:

Measured	4.42E+02	+/-	4.42E+03	Calc from Pu-239
Calculated	1.38E+03	+/-	2.81E+03	

Nuclide Activities:

Isotope	Activity (nCi/g)		Total Unc 1 sigma
Pu-238	4.05E+02	+/-	3.28E+02
Pu-239	1.00E+03	+/-	8.10E+02
Pu-240	5.21E+02	+/-	4.22E+02
Pu-241	1.95E+03	+/-	1.58E+03
Pu-242	5.26E-01	+/-	4.27E-01
Am-241	1.38E+03	+/-	2.81E+03
Np-237	1.05E-02	+/-	8.48E-03
U-238	0.00E+00	+/-	0.00E+00
U-235	0.00E+00	+/-	0.00E+00
Cs-137	2.34E-04	+/-	2.42E-04
Co-60	0.00E+00	+/-	0.00E+00

Results:

<b>Total TRU Activity(nCi/g):</b>	3.31E+03	+/-	2.97E+03	Calc from Pu-239 Act
<b>Pu (g):</b>	2.60E+00	<b>Pu (g) + 3 sigma TMU:</b>	8.91E+00	
		<b>Pu(g) + 3 sigma:</b>	3.22E+00	

Comments:

Am-241 from 722keV peak vnc 4/2/02      Errors:

Analyst:

Martin Winterrose      Date: 4/1/02

#Date & Time: Mon Apr 01 12:57:43 2002

~g=SIMPLE\_CYLINDER

~description=233S-01-0133

~comment=DRUM\_WITH\_SAMPLES

~Ccollimator=50MM-180D

~crpn=4

~Detector=7219

~Convergence in %=1 ~MDRPN=4

~Lunit=IN ~Tunit=C ~Dunit=G/CU.C ~Punit=MM.HG

~at=20 ~ap=760 ~rh=50

~Energies kev=	50.000,	100.000,	128.000,	130.000,	150.000,	200.000,#
	300.000,	500.000,	700.000,	1000.000,	1400.000,	2000.000,#
	4000.000,					

~Error in %=	10.000,	10.000,	10.000,	10.000,	10.000,	8.000,#
	8.000,	6.000,	6.000,	4.000,	4.000,	4.000,#
	4.000,					

~d1.1=0.0416 ~d1.2=22.5 ~d1.3=33.5 ~lmater=CSTEEL ~lden=7.86

~d3.1=33 ~3mater=SAMPLEHS ~3den=0.6393 ~3con=1

~sd1=24

C A N B E R R A I S O C S A N A L Y S I S

Report Generated On : 4/01/02 1:30:23 PM  
 Sample Title : 233s-01-0133  
 Spectrum Description :  
 Sample Identification : 1394  
 Sample Size : 139.6 kg  
 Sample Taken On : 4/01/02 12:58:00 PM  
 Acquisition Started : 4/01/02 12:59:34 PM

Live Time: 1800.0 seconds Real Time: 1839.1 seconds

ISOCS Calabration : 233S-01-0133  
 Energy Calibration Used Done On : 2/27/01  
 Efficiency Calibration Used Done On : 4/01/02

P E A K A N A L Y S I S R E P O R T

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	239.20	59.88	9.70E+005	33620.9	1.51E+004
2	291.97	73.07	2.85E+003	150.87	8.66E+003
3	301.03	75.34	5.82E+003	184.13	8.80E+003
4	314.08	78.60	2.32E+002	89.51	8.94E+003
5	340.32	85.16	2.15E+003	122.87	9.07E+003
6	352.39	88.17	4.74E+002	106.45	9.05E+003
7	396.01	99.07	1.85E+004	744.63	8.78E+003
8	413.72	103.50	9.95E+003	565.74	8.57E+003
9	445.47	111.44	4.10E+003	231.69	8.64E+003
10	460.38	115.16	2.66E+003	315.91	8.30E+003
11	502.56	125.71	3.89E+003	210.86	7.05E+003
12	518.61	129.72	1.83E+004	193.96	6.57E+003
13	576.18	144.10	4.50E+002	147.97	5.52E+003
14	587.65	146.97	6.07E+002	157.29	5.37E+003
15	595.28	148.88	1.31E+003	94.27	5.26E+003
16	644.15	161.09	6.45E+002	85.84	4.59E+003
17	659.79	165.00	3.77E+002	74.64	4.36E+003
18	686.68	171.72	4.41E+002	58.24	4.25E+003
19	784.46	196.16	3.65E+002	50.98	3.15E+003
20	815.33	203.87	2.39E+003	70.15	2.78E+003
21	833.27	208.36	6.43E+003	95.27	2.54E+003
22	1022.95	255.76	3.79E+002	35.03	1.63E+003
23	1202.24	300.57	1.66E+002	40.15	1.15E+003
24	1248.54	312.14	1.61E+003	50.88	1.06E+003
25	1295.60	323.90	2.24E+002	44.51	9.55E+002
26	1332.07	333.01	2.46E+003	76.81	9.14E+002
27	1343.29	335.82	9.86E+002	54.53	8.82E+002
28	1381.04	345.25	2.32E+003	82.19	7.81E+002
29	1473.78	368.43	7.31E+002	67.59	5.92E+002
30	1501.18	375.28	6.45E+003	112.49	5.41E+002
31	1521.44	380.34	1.04E+003	154.76	5.04E+002
32	1533.72	383.41	6.75E+002	124.82	4.80E+002
33	1572.65	393.14	2.10E+003	50.68	4.18E+002

34	1655.74	413.91	5.91E+003	79.48	3.05E+002
35	1691.29	422.79	4.19E+002	26.95	2.51E+002
36	1806.65	451.62	7.53E+002	30.54	1.62E+002
37	2044.75	511.13	1.47E+002	19.68	1.17E+002
38	2333.39	583.26	1.14E+002	14.02	8.64E+001
39	2438.38	609.50	1.19E+002	14.23	8.01E+001
40	2646.65	661.55	6.65E+001	43.32	7.53E+001
41	2649.84	662.35	4.10E+002	45.56	7.43E+001
42	2888.72	722.05	1.87E+002	16.23	5.65E+001

Peak No.	Peak centroid	Energy (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
43	3646.68	911.48	6.40E+001	10.40	3.51E+001
44	5847.31	1461.46	5.61E+002	24.33	9.51E+000
45	7065.01	1765.78	3.81E+001	7.58	2.45E+000

NUCLIDE IDENTIFICATION REPORT

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (uCi)	Activity Uncertainty
CS-137	1.000	661.65*	85.12	2.33657E-004	1.52362E-004
NP-237	0.858	300.17*	6.20	6.21408E-003	1.52824E-003
		312.00*	36.00	1.04906E-002	6.00650E-004
		340.60	4.20		
		375.00*	0.68	2.35571E+000	1.11670E-001
		415.60*	1.75	8.67535E-001	3.77218E-002
Pu-239	0.994	129.28*	0.01	8.57008E+002	1.44181E+002
		375.00*	0.00	1.01236E+003	8.00385E+001
		413.70*	0.00	1.00255E+003	7.94237E+001
		451.50* @	0.00	1.05168E+003	5.93054E+001
AM-241	0.995	59.54*	35.70	1.25534E+002	1.08832E+001
		125.28*	0.00	2.95383E+002	2.14702E+001
		335.40*	0.00	4.76376E+002	3.44501E+001
		662.42* @	0.00	3.40367E+002	3.93369E+001
		722.70*	0.00	4.42039E+002	4.06715E+001
PU-241	0.952	114.00*	0.02	4.01401E+001	5.24563E+000
		332.60*	0.00	2.03110E+002	1.14172E+001

INTERFERENCE CORRECTED REPORT

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (uCi/kg )	Wt mean Activity Uncertainty
CS-137	1.000	2.336575E-004	1.523620E-004
NP-237	0.858	9.930952E-003	5.589891E-004
Pu-239	@ 0.994	9.445736E+002	2.535504E+001
AM-241	@ 0.995	1.964680E+002	9.106225E+000
PU-241	0.952	6.854580E+001	4.766603E+000

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

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 \*\*\*\*\* N U C L I D E M D A R E P O R T \*\*\*\*\*  
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	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (uCi/kg )	Nuclide MDA (uCi/kg )	Activity (uCi/kg )
	CO-60	1173.22	100.00	1.8483E-004	1.61E-004	1.6759E-004
		1332.49	100.00	1.6085E-004		1.6646E-004
	CS-134	475.35	1.46	1.7657E-002	2.36E-004	1.5862E-003
		563.23	8.38	2.6212E-003		-4.4823E-004
		569.32	15.43	1.4551E-003		3.7425E-004
		604.70	97.60	2.7464E-004		-5.5298E-005
		795.84	85.40	2.3605E-004		2.3609E-004
		801.93	8.73	2.0903E-003		-1.7904E-003
		1038.57	1.00	1.6330E-002		-1.1155E-003
		1167.94	1.80	9.7588E-003		-2.7750E-003
		1365.15	3.04	4.7364E-003		3.4150E-003
+	CS-137	661.65*	85.12	1.5131E-004	1.51E-004	2.3366E-004
+	NP-237	300.17*	6.20	5.9837E-003	1.00E-003	6.2141E-003
		312.00*	36.00	1.0030E-003		1.0491E-002
		340.60	4.20	1.9365E-002		1.4199E-002
		375.00*	0.68	4.0499E-002		2.3557E+000
		415.60*	1.75	1.2321E-002		8.6753E-001
+	Pu-239	129.28*	0.01	1.7829E+001	1.42E+001	8.5701E+002
		375.00*	0.00	1.7404E+001		1.0124E+003
		413.70*	0.00	1.4238E+001		1.0025E+003
		451.50*	0.00	8.6375E+001		1.0517E+003
+	AM-241	59.54*	35.70	7.4373E-002	7.44E-002	1.2553E+002
		125.28*	0.00	2.9869E+001		2.9538E+002
		335.40*	0.00	6.8039E+001		4.7638E+002
		662.42*	0.00	3.5573E+001		3.4037E+002
		722.70*	0.00	8.9040E+001		4.4204E+002
+	PU-241	114.00*	0.02	6.4450E+000	6.45E+000	4.0140E+001
		332.60*	0.00	1.1824E+001		2.0311E+002
	CM-243	209.70	3.27	3.5955E-002	4.40E-003	3.8665E-001
		228.18	10.56	6.9408E-003		-1.8283E-003
		277.60	14.00	4.3989E-003		-1.8002E-003

+ = Nuclide identified during the nuclide identification  
 \* = Energy line found in the spectrum  
 > = MDA value not calculated  
 @ = Half-life too short to be able to perform the decay correction

N U C L I D E T O T A L S

Nuclide	Mass (g)
Pu-239	2.13E+000 +/- 5.71E-002